Technical Papers
OF THE BUREAU OF SPORT FISHERIES AND WILDLIFE

28. Studies of Estuarine Dependence of Atlantic Coastal Fishes

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

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28.

Studies of Estuarine Dependence of Atlantic Coastal Fishes

By John Clark, W. G. Smith, Arthur W. Kendall, Jr.,
and Michael P. Fahay

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STUDIES OF ESTUARINE DEPENDENCE OF ATLANTIC COASTAL FISHES

Data Report 1: Northern Section, Cape Cod to Cape Lookout. R. V. Dolphin Cruises 1965-66: Zooplankton volumes, midwater trawl collections, temperatures and salinities.

By

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In 1965, the Sandy Hook Marine Laboratory began research on the extent to which migratory fishes of the Atlantic coast depend on estuaries as essential habitat during the early period of their lives. The final goal is to determine the effects on fishes of the physical disruption and pollution of estuaries that have accompanied accelerated coastal development of the last two decades.

The young of 60 to 70 percent of the economically important Atlantic species inhabit estuarine environments at some time during their first year of life (McHugh, 1966; Clark, 1967). Many species whose young are estuarine dependent spawn offshore, and their progeny, while still very young, swim shoreward or are transported there by currents to take up life in the estuaries for part of their first year (Clark, 1967).

Although it is widely assumed that estuarine habitat is necessary for survival of those Atlantic species whose young are found in estuaries, the assumption can be verified only with assurance that the young are absent or scarce in the open ocean. The juveniles of any species found in estuaries might be the whole of the population or only a part of a population that occurs largely in the open ocean. We have no estimate of the proportion of the young fishes that enter estuaries. To obtain data on ocean occurrences of larval and juvenile fishes or on offshore spawning areas we began our research on estuarine dependence with a systematic survey of the Atlantic continental shelf to locate spawning areas and seasons and to follow the movements of larval and juvenile stages away from the spawning grounds.

In this report we present the basic data from our first series of surveys, the northern section, which includes eight cruises of the research vessel Dolphin (fig. 1) from Cape Cod, Mass., to Cape Lookout, N. C., during the 1-year period, December 1965 to December 1966. The data reported here include temperatures, salinities, zooplankton volumes, and the midwater trawl collections of fishes. Our collection of eggs and larval fishes is under study and will be reported in future publications.

We acknowledge the assistance of the following biologists from cooperating laboratories whose participation guaranteed the success of the early cruises: John C. Poole, New York Department of Conservation and Paul E. Hamer, Walter S. Murawski, Jr., and Ronald White, New Jersey Department of Conservation and Economic Development. The following colleagues assisted us in identifying certain species in the midwater trawl collections: C. Richard Robins, University of Miami, Institute of Marine Sciences, Miami, Fla.; and John A. Musick and John McEachran, Virginia Institute of Marine Science, Gloucester Point, Va. We extend our thanks to Gerald Savitz of the Sandy Hook Marine Laboratory for his painstaking preparation of all graphic material.

Figure 1:--R. V. Dolphin, offshore research vessel of the Sandy Hook Marine Laboratory.

SURVEY DESIGN

We wanted to sample ichthyoplankton of the continental shelf from Nantucket Shoals to Cape Lookout as frequently as possible during the year. We planned to complete each cruise in 2 weeks, with cruises about 6 weeks apart. This is the minimum interval consistent with ship and equipment upkeep, logistics, processing of collections, and sharing the ship with other laboratory research projects. Although gear breakdowns, adverse weather, and the usual problems of ship use delayed or prolonged some cruises, we completed eight plankton surveys with the Dolphin in the period December 1965 to December 1966.

We selected the Gulf V plankton net for sampling fish eggs and larvae because of the following favorable characteristics: (1) The Gulf V can be towed at speeds over 5 knots and thus should have higher capability for capture of larvae during daytime than stramin nets which must be towed at 2 knots or less and thus allow many larvae to escape because of visual warning; (2) the Gulf V has a larger mouth opening than most other high-speed plankton nets, yielding higher catches of eggs and larvae per tow and providing sample sets of higher reliability for comparison; (3) flow-through characteristics of the net are good enough to prevent extensive damage to larvae which could make identification difficult; (4) the Gulf V is simple in design and rugged in construction, thus guaranteeing a minimum of trouble in constant use aboard ship.

The northern sector of the Atlantic continental shelf is characterized by a seasonal thermocline that develops in the spring and remains through early fall (Walford and Wicklund, 1968). The thermocline is typically shallower nearest shore, starting at 8 to 10 meters (4.4 to 5.5 fm.) and is deeper offshore, starting at 15 to 30 meters (8.2 to 16.4 fm.). Therefore, to insure sampling of the whole water layer above the thermocline we decided to collect to a depth of 33 meters (18 fm.). We used two Gulf V nets simultaneously, at all stations where depth permitted, in order to sample separately the upper and lower sectors of our sampling depth range. The tows were step-oblique, the upper net sampling from 0 to 15 meters, the lower from 18 to 33 meters.

Sampling stations were laid out along 14 transects situated as normal to the adjacent beach and as parallel to each other as the coastline configuration would permit (fig. 2). Each transect began at a point as near shore as water depths would allow the *Dolphin* to enter and extended seaward to the edge of the continental shelf. Lengths of transects varied with the width of the shelf from 20 to 75 nautical miles (37 to 130 km.). The 92 sampling stations were spaced along the 14 transects as follows: 5 miles (9.2 km.) apart inshore, 10 miles (18.4 km.) apart at intermediate distances from shore, and 15 miles (27.8 km.) apart offshore. It was necessary to deviate from this plan in some instances to conform with the bathymetry of the continental shelf.

Dolphin cruises are designated by the initial of the ship and the year, and numbered consecutively during the year; thus, D-66-1 was the first cruise of the *Dolphin* in 1966. Each station is designated by a transect letter followed by a number. Station coordinates are given to the nearest 0.5 miles (0.8 km.) in the accompanying table. Station locations remained unchanged on all cruises except on transect P where they were altered after the first and third cruises to provide more variation in water depth.

INSTRUMENTS AND COLLECTING GEAR

Surface water temperatures were measured with stem thermometers accurate to $\pm$ 0.1° C. (manufacturer's specifications). Vertical temperature profiles were obtained with a mechanical bathythermograph. A strip-chart recorder was installed beginning with cruise D-66-7, to provide a continuous record of surface temperatures. Salinities were measured with a portable salinometer (which also provided supplementary temperature data).

The Gulf V high-speed plankton sampler (fig. 3) consists of a conical net supported by a stainless steel cylindrical frame with a mouth diameter of 40 cm. (16 in.) and a length of 130 cm. (51 in.). Netting is 0.33-mm. (0.013-in.) monel wire, with 30 meshes per inch (ca. 12 meshes/cm.) providing an aperature size of 0.52 mm. (0.020 in.). A removable stainless steel cup with a flushing window of the same netting is attached to the rear of the net.

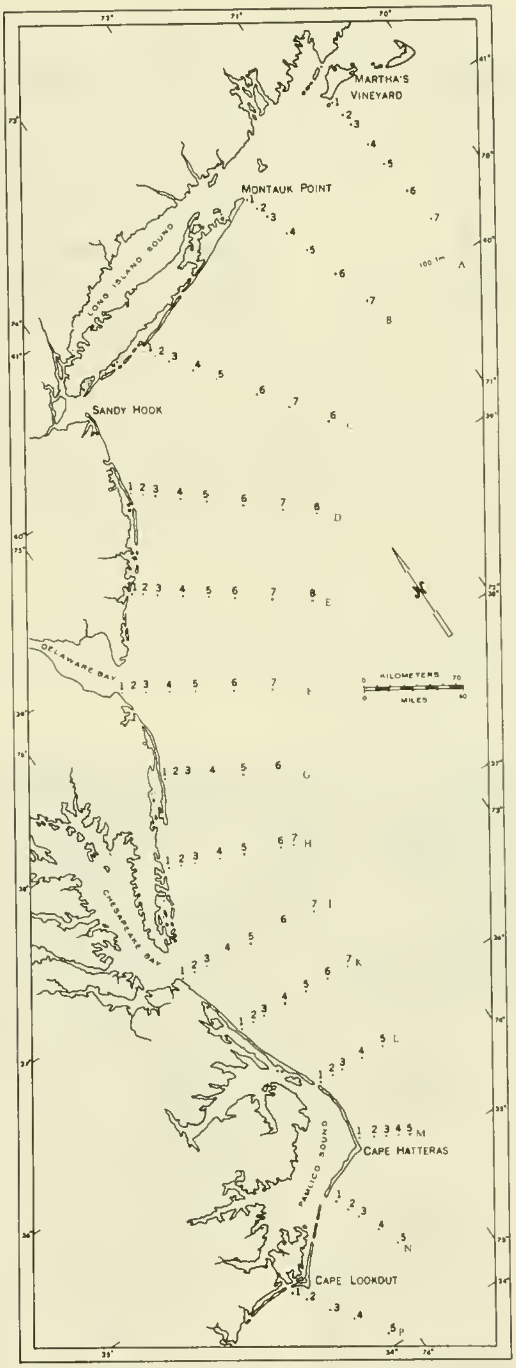

Figure 2:--R. V. *Dolphin* Survey, 1965-66. Locations of transects and collecting stations.

R. V. Dolphin survey, 1965-66. Cruise schedule and transect sampling order

Cruise	Dates	Transect sequence
D-65-4	Dec. 3 - Dec. 15, 1965	C to P
D-66-1	Jan. 25 - Feb. 9, 1966	B, A, C to P
D-66-3	Apr. 6 - Apr. 22, 1966	A to E2, F to P, E8 to E3
D-66-5	May 12 - May 24, 1966	A to N4, P, N5
D-66-7	June 17 - June 29, 1966	A to D, L to P, K to E
D-66-10	Aug. 5 - Aug. 26, 1966	A to P
D-66-12	Sept. 28 - Oct. 20, 1966	M, N, L to A, P
D-66-14	Nov. 9 - Dec. 4, 1966	E1, to E7, F1 to F6, G to J, P to K, F7, E8, D to A

The complete net weighs 35 pounds (16 kg.). In order to provide the least obstruction of flow of water into the net, it is connected to the towing cable with a two-part bridle of 0.25-inch (6.4-mm.) chain, rigged from eyes at either side of the mouth of the net. A 50-pound (23 kg.) cast bronze, high-speed depressor is suspended from the sampler by 7 feet (2.1 m.) of 0.25-inch (6.4-mm.) chain.

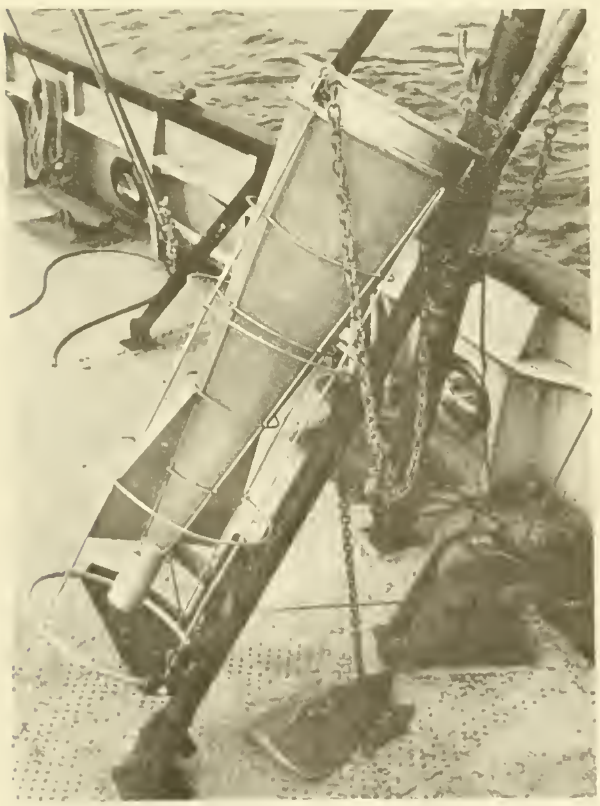

Figure 3:--Gulf V high-speed plankton net with depressor attached.

We used a Cobb Pelagic Trawl-Mark II, scaled down to one-third the linear dimensions of that described by McNeely (1963), in our efforts to collect young nektonic stages of fish large enough to avoid the plankton nets. This mid-water net was made of 1.5-inch (38-mm.) stretch mesh, No. 9 nylon thread; the cod end was lined with knotless nylon netting of 0.25-inch (6.4-mm.) stretch mesh. To enhance the vertical opening of the net, 5-inch (127-mm.) diameter floats were fastened at intervals on the head-rope and 0.25-inch (6.4 mm.) chain was lashed along the footrope. A pair of plywood hydrofoils, reduced to 40 percent of the area of those described by McNeely (1963), was used to provide horizontal opening of the net. Throughout the survey, minor modifications were made to the gear in an attempt to improve its performance.

THE SURVEY

Hydrographic data obtained at each station consisted of vertical temperature and salinity profiles, surface temperatures, and records of weather conditions. Surface temperature patterns are shown for each survey cruise in Appendix figures A1 to A8. Bottom temperatures for each cruise are shown in Appendix figures B1 to B8. Vertical temperature profiles are shown for each transect of each cruise in Appendix figures C1 to C25.

Salinity was measured at the surface and at 5-meter depth intervals as determined by markings on the RS-5 salinometer cable. The cable was kept as near vertical as possible by

attaching a 10-pound (4.5-kg.) weight to the sensor and by moving the ship slowly into the direction of drift with the ship's active-rudder propeller. The salinometer was supplied with a total of 50 meters (27 fm.) of cable which was sufficient to measure salinities to the maximum plankton sampling depth of 33 meters (18 fm.). Surface isohalines for each cruise are shown in Appendix figures D1 to D8. Vertical isohalines are shown for each transect of each cruise in Appendix figures E1 to E25. Bottom isohalines are not shown because salinity readings are not available for the deeper parts of the shelf.

The two Gulf V plankton nets were towed simultaneously for 30 minutes at each station at a constant engine speed, normally covering a distance over the bottom of 2.5 nautical miles (4.8 km.) per tow. Direction of tow followed the transect line except when strong head winds necessitated altering the course to maintain towing speed. With a mouth diameter of 40 cm., 640 cubic meters of water would pass through the Gulf V during a 30-minute tow, if a straining efficiency of 100 percent is assumed. At the end of each tow the nets were retrieved, washed down and the plankton samples placed in quart jars for preservation with 5 percent formalin buffered with borax.

In the oblique tow method used, each Gulf V net was sampled for 5 minutes at six 3-meter (10-ft.) depth increments beginning at the surface. The desired sampling depths were determined by multiplying the amount of wire out by the cosine of the wire angle. In water depths of less than 33 meters the number of steps was reduced for the deep net, and the towing period was increased for the remainder of the steps of the 30-minute tow. Where depths were less than 18 meters we used only the shallow net and where they were less than 15 meters, we reduced the number of steps as we did for the deep net. Depths of the continental shelf along our transects were such that we were able to sample from surface to bottom on 61 percent of the stations occupied.

The Cobb mid-water trawl was towed for 30 minutes at a speed of 3 knots (5.6 km./hour) on a course reciporcal to that of the Gulf V tow. Depth of towing was determined in the same manner as for the Gulf V net. While towing the trawl, we adjusted its depth to position it vertically in layers where the ship's depth recorder indicated concentrations of pelagic fish.

It was not possible to use the trawl at all stations because of weather and operational difficulties. The trawl was not used during cruise D-66-1 and was set at only three stations during cruise D-66-3. The maximum number of tows was made on cruise D-66-12 when 77 of the 92 regular stations were sampled. Station data, including date, time, depth of water, depth range of tow, and number of species captured, are contained in Appendix table II for the 371 trawl tows completed.

Trawl collections were separated to family or species immediately after capture. We counted, measured, and preserved specimens in appropriate concentrations of formalin ranging from 5 to 20 percent. We weighed some of the larger catches of stromateids and clupeoids and drew random sub-samples for measurements. The fishes captured are listed by cruise in Appendix table III. Names are according to Bailey, et al. (1960), except for the family Monacanthidae where Berry and Vogele (1961) are followed.

Loran navigation was the principal method used for positioning the Dolphin on collecting stations. Increased accuracy was obtained on inshore stations by use of radar, land ranges, and by visual sightings of buoys and lightships. Because of inherent limitations of Loran navigation, accuracy of positioning the Dolphin on offshore stations cannot be considered better than ± 1.0 nautical mile (1.8 km.).

The order in which the transects and stations were occupied varied from cruise to cruise being dependent on weather and operational factors (table 1). During our initial cruise (D-65-4) we were not able to occupy stations on transects A and B because of foul weather. Similarly, on cruise D-66-1 we were forced to cancel stations A-3 through A-7 because of foul

weather and station F-1 because of an outflow of ice from Delaware Bay. All stations were occupied on the ensuing six cruises. During cruise D-66-14, stations F-7 and E-8 were initially occupied in sequence with other stations on the respective transects but since the plankton samples were subsequently lost in rough weather, we reoccupied these stations later in the cruise.

LABORATORY PROCEDURES

The workload of identification was divided by assigning to each project biologist certain families of fish appearing in the collections. Technicians were assigned the task of removing fish eggs and larvae from the Gulf V samples. Each sample was processed entirely by one technician. Sorting was done by placing individual 2-milliliter (0.12-in.^{3}) aliquots of plankton in a petri dish and examining each for fish eggs and larvae under a microscope at a magnification of 7 to 10 X. The larvae from each sample were provisionally separated into groups based on physical similarities. These groups consisted of species from one or more families.

To estimate the thoroughness of removal of ichthyoplankton from the samples, routine quality control was maintained whereby aliquots amounting to about 6 percent of the total were taken at random as sorting proceeded and reexamined by a second technician. A comparison of the number of fish eggs and larvae found during each examination of the test aliquots provided a measure of the quality of the sorting and a means of evaluating and improving the technician's work. In the few instances where more than 10 percent of the ichthyoplankton had been overlooked, the sample was re-sorted. This checking technique was developed gradually during the course of sample processing and was used fully during sorting of five of the eight cruises. From these cruises we found that 98 to 100 percent of the eggs and 91 to 97 percent of the larvae were removed during the first sorting of samples when grouped by cruise.

Besides checking random aliquots during sorting, an additional aliquot from the whole sample was checked immediately after the sorting of each sample was finished. Samples from the cruises sorted before this system was implemented were examined during volume measurement, and re-sorted if sufficient numbers of fish eggs or larvae were found to justify it.

The volume of plankton taken in our standardized tows was measured to estimate the standing stock of plankten of sizes large enough to be retained in the Gulf V net. The displacement method was used as had been done in two previous studies of Atlantic coast waters of the United States (Bigelow and Sears, 1939; Deevey, 1960). Methods for improving displacement measurements of plankton have been developed and some were employed in this study (Ealey, 1954; Frolander, 1954; Tranter, 1960; Yentsch and Hebard, 1957). Because plankton volumes decrease significantly with time during the first few months after preservation (Ahlstrom and Thrailkill, 1963), measurement of the samples was delayed for at least 6 months after collection. After the fish eggs and larvae and seston items displacing more than 3 milliliters were removed, the remaining volume of plankton and preservative was measured in a graduate and poured into a filtering funnel containing a disc of nylon mesh with 0.5-mm. (0.02-in.) apertures. The preservative was removed by vacuum filtration and the volume of the filtrate was determined. The difference between the volume of plankton and preservative and of the filtrate was recorded as the plankton volume. The measurements are listed, as milliliters of plankton per tow, in Appendix table II and are shown graphically in Appendix figures F1 to F8.

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Table I:--R. V. *Dolphin* survey, 1965-66. Locations of collecting stations

Locations are given by coordinates of North Latitude over West Longitude, listed to the nearest 0.5 nautical mile (0.9 km.)

TRANSECT	STATION 1	2	3	4	5	6	7	8
A	41°17.0' 70°48.0'	41°12.0' 70°47.0'	41°07.0' 70°46.0'	40°57.0' 70°44.5'	40°47.5' 70°42.5'	40°32.5' 70°40.0'	40°17.5' 70°37.0'	
B	41°03.5' 71°51.5'	40°58.5' 71°49.5'	40°54.0' 71°47.5'	40°44.0' 71°44.0'	40°34.5' 71°40.5'	40°20.0' 71°35.0'	40°05.0' 71°29.5'	
C	40°35.0' 73°17.5'	40°31.0' 73°14.0'	40°27.0' 73°10.0'	40°19.0' 73°03.0'	40°10.5' 72°55.0'	39°58.5' 72°44.5'	39°46.5' 72°33.5'	39°34.0' 72°22.5'
D	39°51.5' 74°04.0'	39°48.5' 73°59.0'	39°45.0' 73°54.0'	39°39.0' 73°43.5'	39°32.5' 73°33.5'	39°23.5' 73°19.0'	39°14.0' 73°03.0'	39°06.0' 72°50.0'
E	39°17.0' 74°31.0'	39°14.0' 74°25.5'	39°11.0' 74°20.5'	39°05.5' 74°09.5'	38°59.0' 73°59.0'	38°54.0' 73°49.0'	38°45.0' 73°33.5'	38°36.0' 73°18.0'
F	38°46.0' 75°03.5'	38°43.5' 74°58.0'	38°40.5' 74°52.5'	38°35.0' 74°41.5'	38°29.0' 74°30.0'	38°21' 74°13.5'	38°13.0' 73°57.5'	
G	38°07.5' 75°09.5'	38°04.5' 75°04.5'	38°01.5' 74°59.0'	37°56.0' 74°48.5'	37°50.0' 74°38.0'	37°42.0' 74°22.5'		
H	37°34.0' 75°33.5'	37°32.0' 75°28.0'	37°30.5' 75°22.5'	37°27.0' 75°10.0'	37°23.5' 74°58.0'	37°18.5' 74°40.5'	37°16.5' 74°34.0'	
J	36°55.5' 75°58.5'	36°55.0' 75°52.0'	36°54.5' 75°45.5'	36°53.0' 75°33.0'	36°52.0 75°21.0'	36°50.5' 75°02.5'	36°48.5' 74°44.5'	
K	36°23.0' 75°48.5'	36°23.0' 75°42.0'	36°22.5' 75°36.0'	36°22.5' 75°23.5'	36°22.0' 75°11.0'	36°21.5' 74°58.5'	36°21.0' 74°46.0'	
L	35°46.5' 75°30.0'	35°46.5' 75°24.0'	35°46.0' 75°17.5'	35°45.5' 75°05.0'	35°45.0' 74°52.5'			
M	35°18.5' 75°29.0'	35°16.5' 75°23.5'	35°14.5' 75°18.0'	35°12.5' 75°12.0'	35°10.5' 75°07.0'			
N	35°01.0' 75°57.0'	34°56.0' 75°55.0'	34°51.5' 75°52.5'	34°42.0' 75°48.0'	34°33.0' 75°44.0'			
P1/	34°38.0' 76°40.0'	34°29.5' 76°33.5'	34°21.0' 76°26.5'	34°13.0' 76°20.0'	34°04.5' 76°13.0'			
P2/	34°38.0' 76°40.0'	34°34.0' 76°37.0'	34°29.5' 76°33.5'	34°17.0' 76°23.5'	34°04.5' 76°13.0'			
P3/	34°38.0' 76°40.0'	34°34.0' 76°37.0'	34°25.0' 76°36.5'	34°17.0' 76°23.5'	34°04.5' 76°13.0'			

1/ Cruise D-65-4. 2/ Cruises D-66-1 and D-66-3. 3/ Cruises D-66-5 through D-66-14.

Table II:--R. V. Dolphin survey, 1965-66. Station data for Gulf V plankton net and midwater trawl tows

Stations are listed in the sequence of completion of plankton tows.

Light regimens are listed as Dawn or Dusk when sunrise or sunset occurred during the plankton tow at any station.

The biomass of plankton for each tow is represented as a displacement volume in milliliters, measured after removal of ichthyoplankton and seston items larger than 3 milliliters.

When materials in the sample prevented measurement by blocking filtration the predominant material is noted as follows: D, dinoflagelates; T, thaliaceans; and S, sediments.

Starting times only are given for the standard 30-minute midwater trawl tows; when tows were other than 30-minutes long, both starting and finishing times are given.

An asterisk (*) appears after the maximum fishing depth to indicate stations where the midwater trawl accidentally struck bottom, as indicated by debris and benthic animals in the net.

Table II:--R. V. Dolphin survey, 1965-66. Station data for Gulf V plankton net and midwater trawl tows

CRUISE Station	DATE	PLANKTON NET TOW: START TIME	LIGHT REGIMEN	PLANKTON VOLUME: SHALLOW	PLANKTON VOLUME: DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-65-4	Dec.	EST											
C-1	3	2243	Night	150									
C-2	3 & 4	2353	Night	130									
C-3	4	0137	Night	85	105								
C-4	4	0312	Night	60	70								
C-5	4	0449	Night	110	95								
C-6	4	0702	Dawn	105	120								
C-7	4	0928	Day	60	70	1155-1246	46	84	5	9	17	31	1
C-8	4	1536	Day	25	15	1427-1500	100	183	5	9	17	31	0
D-1	5	1458	Day	75									
D-2	5	1557	Day	85									
D-3	5	1708	Night	100									
D-4	5	1905	Night	115	125								
D-5	5	2049	Night	210	145								
D-6	5	2319	Night	85	110								
D-7	6	0118	Night	50	55								
D-8	6	0312	Night	35	30								
E-8	6	1013	Day	35	30	1133	61	112	5	9	17	31	1
E-7	6	1530	Day	50	50	1453	36	66	5	9	17	31	0
E-6	6	1748	Night	105	65								
E-5	6	2035	Night	50	55								
E-4	6	2222	Night	175									
E-3	7	0012	Night	65									
E-2	7	0118	Night	75									
E-1	7	0206	Night	130									

Table II:--Continued

		PLANKTON NET TOW				MIDWATER TRAWL TOW							
CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	DEEP	START TIME	START DEPTH		FISHING DEPTH MIN.		MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-65-4	Dec.	EST											
F-1	9	1707	Night	200									
F-2	9	1803	Night	245									
F-3	9	1901	Night	215		2003-2045	16	29	8	15	30	55	3
F-4	10	0119	Night	95									
F-5	10	0243	Night	85	120	0356	19	35			20	55	2
F-6	10	0745	Day	105	115	0635	26	48			10	18	1
F-7	10	1005	Day	85	85	1103	36	66	5	9	17	31	0
G-6	10	1605	Day	80	60	1510	40	73	5	9	17	31	0
G-5	10	1754	Night	125	100	1851	25	46	5	9	17	31	0
G-4	10	2126	Night	120		2028	16	29	5	9	11	20	1
G-3	10	2302	Night	80		0004	8	15			5	9*	1
G-2	11	0118	Night	60									
G-1	11	0203	Night	60									
H-1	11	0632	Dawn	125									
H-2	11	0718	Day	100									
H-3	11	0812	Day	90		0904-0942	15	27			5	9	0
H-4	11	1237	Day	95		1145	13	24			5	9	0
H-5	11	1409	Day	75	155	1511	18	33	5	9	9	16	0
H-6	11	1802	Night	95	65	1710	44	81	5	9	17	31	3
H-7	11	1949	Night	60	50								
J-7	11	2309	Night	45	40	0012	43	79	5	9	17	31	0
J-6	12	0318	Night	120	60	0221	19	35	5	9	11	20	1
J-5	12	0537	Night	95		0638	14	26	5	9	12	22	1
J-4	12	0902	Day	175		0806	13	24			5	9	0

* Trawl touched bottom during tow.

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-65-4	Dec.	EST											
J-3	12	1030	Day	50									
J-1	12	1813	Night	35									
J-2	12	1900	Night	50									
K-1	12	2249	Night	130									
K-2	12	2341	Night	100									
K-3	13	0038	Night	60		0132	14	26			5	9	1
K-4	13	0410	Night	80	115	0320	16	29	5	9	11	20	2
K-5	13	0607	Night	60	120	0701	21	38	5	9	12	22	1
K-6	13	0948	Day	70	90	0858	26	48	5	9	17	31	1
K-7	13	1138	Day	40	20								
L-1	13	1939	Night	110									
L-2	13	2044	Night	155									
L-3	13	2152	Night	115	95	2247	20	37	5	9	12	22	0
L-4	14	0125	Night	75	30	0038	27	49	5	9	11	20	0
L-5	14	0315	Night	30	45	0410	66	121	5	9	17	31	0
M-5	14	1235	Day	90	55	1325	46	84	5	9	17	31	0
M-4	14	1445	Day	45	70								
M-3	14	1553	Day	100		1642	11	20			5	9	0
M-2	14	1730	Night	95									
M-1	14	1838	Night	90									
N-1	14	0005	Night	80									
N-2	15	0058	Night	65		0147	13	24			5	9	1
N-3	15	0341	Night	50		0257	13	24			5	9	1
N-4	15	0520	Night	70	60	0615	26	48	5	9	17	31	0
N-5	15	0900	Day	40	60	0810	80	146	5	9	17	31	2

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW: START TIME	LIGHT REGIMEN	PLANKTON VOLUME: SHALLOW	PLANKTON VOLUME: DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-65-4	Dec.	EST											
P-5	15	1335	Day	35	25	1430	30	55	5	9	18	33	0
P-4	15	1630	Dusk	D	D	1545	23	42	5	9	11	20	0
P-3	15	1810	Night	D									
P-2	15	1935	Night	D									
P-1	15	2051	Night	D									
D-66-1													
B-7	25	2144	Night	30	35								
B-6	25	2347	Night	25	35								
B-5	26	0115	Night	25	25								
B-4	26	0254	Night	20	35								
B-3	26	0429	Night	40	40								
B-2	26	0542	Night	15									
B-1	26	0653	Dawn	40									
A-1	26	1627	Dusk	60									
A-2	26	1729	Night	75									
	Feb.												
C-1	2	0106	Night	155									
C-2	2	0158	Night	100									
C-3	2	0257	Night	65	70								
C-4	3	2042	Night	40	25								
C-5	3	2208	Night	70	20								
C-6	4	0010	Night	20	10								
C-7	4	0220	Night	20	25								
C-8	4	0408	Night	40	10								

D - Dinoflagelates predominant in the sample.

Table II:--Continued

		PLANKTON NET TOW				MIDWATER TRAWL TOW							
				PLANKTON VOLUME		START			FISHING DEPTH				NO.
CRUISE Station	DATE	START TIME	LIGHT REGIMEN	SHALLOW	DEEP	TIME	DEPTH		MIN.		MAX.		SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-1	Feb.	EST											
D-8	4	0827	Day	65	75								
D-7	4	1016	Day	35	30								
D-6	4	1210	Day	35	30								
D-1	4	1729	Night	80									
D-2	4	1816	Night	40									
D-3	4	1910	Night	100									
D-4	4	2028	Night	60									
D-5	4	2220	Night	75	85								
E-1	5	0321	Night	130									
E-2	5	0415	Night	45									
E-3	5	0508	Night	55									
E-4	5	0635	Dawn	60									
E-5	5	0804	Day	65	60								
E-6	5	0933	Day	75	50								
E-7	5	1126	Day	60	40								
E-8	5	1326	Day	60	20								
F-7	5	1747	Night	15	S								
F-6	5	2246	Night	10	5								
F-5	6	0108	Night	25	30								
F-4	6	0242	Night	75									
F-3	6	0359	Night	130									
F-2	6	0520	Night	75									
G-1	6	0946	Day	30									
G-2	6	1046	Day	10									
G-3	6	1147	Day	55									
G-4	6	0103	Day	20									

S - Sediments in the sample.

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-1	Feb.	EST											
G-5	6	1428	Day	10	10								
G-6	6	1611	Day	35	50								
H-7	6	1903	Night	20	30								
H-6	6	2011	Night	30	10								
H-5	6	2206	Night	25	30								
H-4	6	2332	Night	40									
H-3	7	0059	Night	75									
H-2	7	0200	Night	115									
H-1	7	0253	Night	20									
J-1	7	0721	Day	15									
J-2	7	0812	Day	20									
J-3	7	0906	Day	5									
J-4	7	1030	Day	15									
J-5	7	1143	Day	40									
J-6	7	1321	Day	20	50								
J-7	7	1514	Day	5	10								
K-7	7	1807	Night	80	75								
K-6	7	1938	Night	25	20								
K-5	7	2101	Night	20	20								
K-4	7	2220	Night	30									
K-3	7	2332	Night	40									
K-2	8	0038	Night	40									
K-1	8	0138	Night	40									
L-1	8	0711	Day	5									
L-2	8	0824	Day	25									
L-3	8	0927	Day	40	55								

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-1	Feb.	EST											
L-4	8	1050	Day	40	75								
L-5	8	1225	Day	20	15								
M-1	8	1633	Day	10									
M-2	8	1726	Dusk	5									
M-3	8	1822	Night	25									
M-4	8	1915	Night	25	15								
M-5	8	2018	Night	95	65								
N-1	9	0034	Night	15									
N-2	9	0126	Night	50									
N-3	9	0218	Night	65									
N-4	9	0351	Night	45	30								
N-5	9	0509	Night	65	40								
P-5	9	0848	Day	35	25								
P-4	9	1033	Day	40									
P-3	9	1154	Day	35									
P-2	9	1244	Day	40									
P-1	9	1337	Day	35									
D-66-3	Apr.												
A-1	6	1757	Day	95									
A-2	6	1911	Night	35									
A-3	6	2110	Night	40	65								
A-4	6	2238	Night	50	55								
A-5	6 & 7	0029	Night	50	55								
A-6	7	0208	Night	25	15								
A-7	7	0355	Night	60	50								

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-3	Apr.	EST											
B-7	7	0801	Day	40	90								
B-6	7	1005	Day	65	55								
B-5	7	1156	Day	55	5								
B-4	7	1324	Day	70	50								
B-3	7	1455	Day	10	10								
B-2	7	1556	Day	20									
B-1	7	1650	Day	20									
C-1	8	0005	Night	55									
C-2	8	0058	Night	100									
C-3	8	0156	Night	20	25								
C-4	8	0316	Night	20	15								
C-5	8	0445	Night	10	10								
C-6	8	0644	Day	30	30								
C-7	8	0851	Day	75	50								
C-8	8	1048	Day	55	50								
D-8	8	1530	Day	30	55								
D-7	8	1722	Day	40	50								
D-6	8	1930	Night	85	30								
D-5	8	2127	Night	55	60								
D-4	8	2317	Night	80									
D-3	9	0035	Night	60									
D-2	9	0125	Night	35									
D-1	9	0213	Night	110									
E-1	13	0056	Night	65									
E-2	13	0228	Night	55									
F-1	14	1045	Day	25									

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-3	Apr.	EST											
F-2	14	1146	Day	35									
F-3	14	1243	Day	70									
F-4	14	1404	Day	40									
F-5	14	1528	Day	25	30								
F-6	14	1719	Day	70	50								
F-7	14	1910	Night	35	40								
G-6	14	2245	Night	70	110								
G-5	15	0045	Night	30	30								
G-4	15	0204	Night	30									
G-3	15	0323	Night	35									
G-2	15	0454	Night	50									
G-1	15	0655	Day	55									
MWT-1 1/	15					0810-0910	6	11			5	9*	2
MWT-2 1/	15					1120	8	15			10	19*	11
H-1	15	1406	Day	15									
H-2	15	1452	Day	10									
H-3	15	1548	Day	45									
H-4	15	1712	Day	30									
H-5	15	1911	Night	35	30	2010-2030	22	40	13	24	18	33*	1
H-6	15	2210	Night	90	90								
H-7	15	2320	Night	55	65								

1/ Extra midwater trawl stations between transects G and H. Station Locations: MWT-1: 37°59'N; 75°11.5'W. MWT-2: 37°44.5'N; 75°22'W.

Table II:--Continued

		PLANKTON NET TOW				MIDWATER TRAWL TOW							
				PLANKTON VOLUME		START			FISHING DEPTH				NO.
CRUISE Station	DATE	START TIME	LIGHT REGIMEN	SHALLOW	DEEP	TIME	DEPTH		MIN.		MAX.		SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-3	Apr.	EST											
J-7	16	0212	Night	40	50								
J-6	16	0406	Night	40	40								
J-5	16	0545	Day	10									
J-4	16	0707	Day	15									
J-3	16	0825	Day	25									
J-1	19	1132	Day	15									
J-2	19	1216	Day	25									
K-1	19	1528	Day	10									
K-2	19	1617	Day	10									
K-3	19	1715	Day	15									
K-4	19	1833	Dusk	15									
K-5	19	1953	Night	20	25								
K-6	19	2115	Night	40	45								
K-7	19	2243	Night	50	60								
L-5	20	0209	Night	65	70								
L-4	20	0331	Night	45	35								
L-3	20	0448	Night	10	10								
L-2	20	0541	Night	10									
L-1	20	0635	Day	20									
M-1	20	1001	Day	40									
M-2	20	1053	Day	35									
M-3	20	1148	Day	30									
M-4	20	1245	Day	55	60								
M-5	20	1346	Day	255	255								
N-1	20	1753	Day	95									
N-2	20	1851	Night	105									

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-3	Apr.	EST											
N-3	20	1948	Night	45	55								
N-4	20	2125	Night	90	190								
N-5	20	2316	Night	65	60								
P-5	21	0427	Night	35	45								
P-4	21	0625	Day	140	95								
P-3	21	0815	Day	45									
P-2	21	0906	Day	45									
P-1	21	0956	Day	55									
E-8	22	1150	Day	25	35								
E-7	22	1344	Day	30	30								
E-6	22	1527	Day	25	30								
E-5	22	1640	Day	30	35								
E-4	22	1756	Day	25	30								
E-3	22	1912	Night	90									
D-66-5	May	EDST											
A-1	12	2102	Night	80									
A-2	12	2209	Night	100	70	2305	19	35	0	0			0
A-3	13	0108	Night	170	95								
A-4	13	0253	Night	160	140								
A-5	13	0425	Night	180	150								
A-6	13	0634	Day	140	165								
A-7	13	0906	Day	175	200								
B-7	13	1337	Day	150	285								
B-6	13	1553	Day	200	160								
B-5	13	1741	Day	275	230								

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-5	May	EDST											
B-4	13	1912	Day	600	205								
B-3	13	2036	Night	90	90								
B-2	13	2138	Night	140									
B-1	13	2233	Night	130									
C-8	14	0715	Day	190	245	0840-0920	210	384	10	19	41	74	0
C-7	14	1318	Day	245	215	1132-1230	37	68	12	21	32	59	1
C-6	14	1442	Day	60	80	1548	32	59	13	24	28	52*	2
C-5	14	1775	Day	30	30								
C-4	14	1907	Day	35	30								
C-3	14	2035	Night	100	110								
C-2	14	2130	Night	130									
C-1	14	2224	Night	260									
D-1	16	2005	Night	20									
D-2	16	2103	Night	55									
D-3	16	2158	Night	60									
D-4	16	2323	Night	30									
D-5	17	0052	Night	25	10								
D-6	17	0255	Night	25	40								
D-7	17	0456	Night	10	30								
D-8	17	1008	Day	90	100	0900	68	124	10	19	30	54	0
E-8	17	1358	Day	110	225	1455	61	112	10	18	30	55	0
E-7	17	1811	Day	50	40	1710	39	71	10	18	30	55	0
E-6	17	1939	Dusk	25	25	2030	18	33			10	17	1
E-5	17	2253	Night	35	30	2157	21	38			10	17	3
E-4	17 & 18	2355	Night	30	35	0053	17	31			10	19	3
E-3	18	0310	Night	60		0215	12	22			3	6	2
E-2	18	0414	Night	60		0730	10	18	3	6	4	7	2

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-5	May	EDST											
E-1	18	0514	Dawn	80		0604	6	11			3	6	8
F-1	18	1508	Day	65		1405	99	17			3	5	7
F-2	18	1556	Day	100		1246	11	20	3	5	10	18	5
F-3	18	1705	Day	105	100	1128	16	29	7	13	12	22	1
F-4	18	1810	Day	90		1855	12	22			10	19	2
F-5	18	2124	Night	50	35	2030	22	40	10	17	13	23	1
F-6	18	2250	Night	35	30	2350	27	49	10	17	26	48	2
F-7	19	0230	Night	70	95	0135	38	70	8	16	30	55	0
G-6	19	0602	Day	40	50	0652	44	81	6	10-	13	25	0
G-5	19	0945	Day	30	25	0841	30	55	10	19	21	39	0
G-4	19	1052	Day	25	30	1145-1200	17	31	10	19	16	28	0
G-3	19	1421	Day	90		1315	13	24			7	13	1
G-2	19	1500	Day	65									
G-1	19	1555	Day	40									
H-3	19	1953	Night	45		0129	10	18	5	9	8	14	2
H-2	19	2045	Night	170		0018	8	15			7	12*	5
H-1	19	2136	Night	140		2230	8	15	4	6	5.	8	8
H-4	20	0407	Night	20		0310	18	33	5	9	10	19	2
H-5	20	0527	Dawn	25	30	0622	22	40	5	8	18	32*	5
H-6	20	0956	Day	30	30	0905	46	84	9	16	39	71	0
H-7	20	1047	Day	40	35	1140	55	101	19	34	51	94	1
J-7	20	1613	Day	160	220	1508	49	90	12	21	18	32	0
J-6	20	1746	Day	20	30	1835	19	35	10	19	12	21	0
J-5	20	2120	Night	90		2026	17	31			10	17	0
J-4	20	2217	Night	250		2304	11	20			10	19*	5
J-1	21	0515	Night	20		0425	9	17			5	8*	9

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-5	May	EDST											
J-2	21	0605	Day	30		0310	7	13			5	8	10
J-3	21	0647	Day	60		0152	10	18	5	6	8	16*	5
K-1	21	2219	Night	45		2312	9	17			7	12	7
K-2	21	2132	Night	40		0038	12	22	7	12	9	16	2
K-3	21	2040	Night	445		0155	14	26	6	11	8	16	1
K-4	22	0423	Night	30	30	0331	17	31	11	21	13	24	0
K-5	22	0533	Dawn	30	40	0630	19	35	12	22	18	32*	1
K-6	22	0921	Day	30	60	0822	22	40	10	17	17	30*	0
K-7	22	1127	Day	40	50	1217	404	739	10	27	19	35	0
L-5	22	1641	Day	20	40	1550	44	81	9	16	23	43	0
L-4	22	1748	Day	90	115	1855	22	40			14	25	0
L-1	22 & 23	0043	Night	50		2340	7	13	4	7	6	11	2
L-2	23	0141	Night	110		2240	11	20			7	14*	3
L-3	23	0239	Night	60	80	2107	115	27			14	27*	6
M-3	23	0929	Day	120		1528	16	29	7	12	11	21	0
M-2	23	1029	Day	80		1419	11	20	5	9	8	14	0
M-1	23	1138	Day	70		1253	7	15			5	9*	11
M-4	23	1704	Day	55	70	0800	30	55			0	0	1
M-5	23	1819	Day	190	40	0632	130	238	4	6	9	17	0
N-1	24	0159	Night	50		0107	14	26	4	6	5	9	2
N-2	24	0254	Night	90									
N-3	24	0355	Night	50	90	2257	21	38	4	7	15	27	2
N-4	24	0530	Dawn	45	40	0618	27	49	4	7	8	14	0
P-1	24	1624	Day	20		1416	10	18	4	7	6	11	0
P-2	24	1715	Day	15		1256	11	20	5	8	7	12	0

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW: START TIME	PLANKTON NET TOW: LIGHT REGIMEN	PLANKTON VOLUME: SHALLOW	PLANKTON VOLUME: DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH: MIN.		FISHING DEPTH: MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-5	May	EDST											
P-3	24	1836	Day	50		1125	8	15	4	7	10	17	0
P-4	24	2004	Dusk	160	80	2047	18	33	4	7	12	22	0
P-5	24 & 25	0003	Night	40	50	2311	80	146			10	19	0
N-5	25	0258	Night	45	60								
D-66-7	June												
A-1	17	0927	Day	280		0819	11	20			8	16*	2
A-2	17	1037	Day	90		0711-0726	19	35	6	11	14	26	0
A-3	17	1137	Day	110	160	0608	20	37	5	9	17	32	0
A-4	17	1322	Day	180	220	1413	29	53	3	5	8	16	0
A-5	17	1703	Day	185	190	1606	33	60	6	11	12	22	0
A-6	17	1919	Day	135	240	2005	41	75	17	32	45	83*	1
A-7	17 & 18	2343	Night	90	110	2247	63	115	23	42	36	67	1
B-7	18	0412	Night	160	210	0504	54	99	8	16	208	38	0
B-6	18	0833	Day	205	170	0720	45	82	21	38	41	76	0
B-5	18	1036	Day	260	280	1123	41	75			24	44	0
B-4	18	1402	Day	280	235	1307	35	64	5	9	16	28	0
B-3	18	1525	Day	240	275	2039	25	46			16	28	1
B-2	18	1622	Day	220	60	1930	16	29	11	21	15	27	1
B-1	18	1732	Day	115		1822	13	24	10	17	14	25*	3
C-1	19	0628	Day	180		0534	13	24	5	9	13	23	0
C-2	19	0730	Day	220	305	0432	16	29	6	11	9	16	3
C-3	19	0827	Day	315	310	0325	19	35	6	11	15	27	3
C-4	19	0955	Day	120	195	1037	25	46	9	16	25	46*	3
C-5	19	1324	Day	70	120	1222	28	51	5	9	19	34	5
C-6	19	1531	Day	240	170	1623	32	58	5	9	21	38	3

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-7	June	EDST											
C-7	19	2043	Night	255	95	1951	42	77	21	38	37	36	0
C-8	19	2310	Night	80	60	2355	175	320			34	61	1
D-8	20	0443	Night	265	260	0330	67	122	5	9	19	34	2
D-7	20	0625	Day	40	100								
D-6	20	0844	Day	35	40	0940	31	57	11	21	23	41	6
D-5	20	1138	Day	30	50								
D-4	20	1309	Day	35	110								
D-3	20	1429	Day	85									
D-2	20	1525	Day	90									
D-1	20	1630	Day	130									
L-5	22	2003	Dusk	55	60	0828	58	106	10	17	18	33	2
L-4	22	2128	Night	40	55	0646	20	37	9	16	19	34	0
L-3	22	2244	Night	40	45	0514	18	33	9	16	14	26	3
L-2	23	0025	Night	60		0410	12	22	6	10	11	21	4
L-1	23	0202	Night	45		0258	9	16	6	10	10	19*	9
M-1	23	1806	Day	50		1714	9	16	6	11	9	16*	1
M-2	23	1905	Day	50		1611	11	20	5	9	9	16	2
M-3	23	1953	Dusk	100		1512	16	29	5	9	9	16	2
M-4	23	2103	Night	70	40	1408	15	27	5	9	9	16	3
M-5	23	2210	Night	110	70	1255-1315	64	117	7	13	14	26	0
N-3	24	0224	Night	30		0708	15	27	4	7	8	14	1
N-2	24	0320	Night	30		0605	14	26	4	7	7	13	1
N-1	24	0414	Night	50		0503	12	22	7	13	13	23	0
N-4	24	0951	Day	55	30	0902	23	42			9	16	1
N-5	24	1138	Day	30	40	1226	117	214	9	16	19	34	0

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-7	June	EDST											
P-4	24	1618	Day	35	30	0225	19	35	7	13	18	33	2
P-1	24	1934	Day	50		2024	10	18			6	10	4
P-2	24	2226	Night	45		2139	10	18			12	21*	10
P-3	25	0011	Night	80		0059	11	20	5	9	10	19*	10
P-5	25	0526	Dawn	60		0437	78	143	14	25	26	29	0
K-7	25	1841	Day	25	60	1929	75	137	7	13	13	23	0
K-6	25	2205	Night	240	100								
K-5	25	2338	Night	60	55	0040	18	33	7	13	17	30	6
K-4	26	0318	Night	75	70	0222	19	35	8	16	18	33*	4
K-3	26	0445	Night	90		0914	14	26	7	13	11	10	0
K-2	26	0537	Dawn	10		0815	12	22	7	13	12	21	0
K-1	26	0632	Day	10		0715	8	15			6	11	0
J-1	26	1511	Day	10		1345	7	13			5	9	0
J-2	26	1604	Day	20		1348	8	15	5	9	7	13*	0
J-3	26	1702	Day	55		1251	11	20	6	11	9	16	0
J-4	26	1821	Day	30		1902	14	26			11	21*	0
J-5	26	2129	Night	60		2045	14	26			15	27	3
J-6	26	2329	Night	170	260	0016	20	37	7	13	17	30	2
J-7	27	0316	Night	200	220	0230	46	84	7	13	33	60	0
H-6	27	0654	Day	80									
H-6	27	0905	Day		380	0944	44	81			10	17	1
H-7	27	0758	Day	35	500								
H-5	27	1245	Day	10	30	1208	20	37			7	13	
H-4	27	1419	Day	90	195								
H-3	27	1534	Day	25									
H-2	27	1621	Day	55									
H-1	27	1713	Day	30									

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW: START TIME	LIGHT REGIMEN	PLANKTON VOLUME: SHALLOW	PLANKTON VOLUME: DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH: MIN.		FISHING DEPTH: MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-7	June	EDST											
G-6	27	2253	Night	65	250								
G-5	28	0046	Night	150	185								
G-4	28	0213	Night	215									
G-3	28	0335	Night	95									
G-2	28	0425	Night	55									
G-1	28	0517	Dawn	50									
F-1	28	0933	Day	110									
F-2	28	1017	Day	30									
F-3	28	1102	Day	130									
F-4	28	1222	Day	80									
F-5	28	1345	Day	10	180								
F-6	28	1534	Day	60	25								
F-7	28	1808	Day	60	185								
E-8	28	2225	Night	30	180								
E-7	29	0040	Night	175	100								
E-6	29	0228	Night	100	70								
E-5	29	0347	Night	60	70								
E-4	29	0508	Dawn	60									
E-3	29	0624	Day	30									
E-2	29	0716	Day	165									
E-1	29	0805	Day	85									
D-66-10	Aug.												
A-1	5	0502	Night	20									
A-2	5	0607	Day	30									
A-3	5	0701	Day	60	50	0245	24	44	3	5	4	8	2
A-4	5	0840	Day	30	50	0937	30	55			10	17	1

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-10	Aug.	EDST											
A-5	5	1219	Day	90	70	1125	31	57	10	18	14	25	2
A-6	5	1441	Day	70	70	1528	39	71	6	11	8	16	0
A-7	5	1741	Day	40	40	1827	62	113			11	20	0
B-7	5 & 6	2340	Night	40	90	2237	50	91			11	20	3
B-6	6	0133	Night	80	275	0232	45	82	6	11	7	14	3
B-5	6	0544	Dawn	120	180	0447	40	73	8	14	11	20	1
B-4	6	0720	Day	120	100	0813	32	58	9	16	24	45	1
B-3	6	1101	Day	D	50	1010	25	46	10	17	24	45*	0
B-2	6	1149	Day	120	70	1444	14	26	3	5	7	14	0
B-1	6	1349	Day	50		1337	10	18	5	9	7	14	0
C-1	6 & 7	0043	Night	50		2350	11	20	6	11	8	16	0
C-2	6 & 7	0137	Night	160		2233	15	27	15	27	24	45*	7
C-3	6 & 7	0239	Night	125	265	2125	17	31	6	10	23	42*	4
C-4	7	0413	Night	120	295	0508	22	40	5	8	9	17	1
C-5	7	0745	Day	30	235	0656	25	46	9	16	23	42	0
C-6	7	1005	Day	10	75	1050	30	55	8	14	8	16	1
C-7	7	1406	Day	190	175	1315	35	64	6	11	16	29	2
C-8	7	1630	Day	90	90	1719	95	174	6	11	17	31	1
D-8	7	2221	Night	60	150	2121	66	121	11	20	17	31	2
D-7	8	0018	Night	360	160	0115	39	71	7	13	16	29	4
D-6	8	0422	Night	20	130	0320	28	51	6	11	14	26	1
D-5	8	1615	Day	60	50	0702	18	33			15	27	3
D-4	8	0936	Day	25		0843	15	27	6	11	13	24*	3
D-3	8	1052	Day	D		1549	13	24	7	13	17	31*	1
D-2	8	1144	Day	5		1437	11	20	7	13	12	22*	0
D-1	8	1239	Day	5		1328	8	15	5	9	9	16	1

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-10	Aug.	EDST											
E-1	8	2305	Night	35		2217	77	13			8	14*	10
E-2	8 & 9	2359	Night	15		2111	9	16	7	13	11	20*	4
E-3	8 & 9	0057	Night	230		2000	13	24	5	9	16	28*	3
E-4	9	0800	Day	165		0841	15	27			14	26	2
E-5	9	1113	Day	60	165	1021	21	38			10	17	0
E-6	9	1306	Day	250	95								
E-7	9	1505	Day	210	75								
E-8	9	1711	Day	60	110								
F-7	9	2118	Night	200	130								
F-6	9	2306	Night	260	155								
F-5	10	0052	Night	235	45								
F-4	10	0246	Night	90									
F-3	10	0407	Night	50									
F-2	10	0500	Night	25		2323	11	20			10	19*	15
F-1	10	0554	Dawn	5		0055	11	20			10	19*	14
G-1	21	0637	Day	D		0539	6	11			5	8	5
G-2	21	0740	Day	D		0427	8	15			7	13*	10
G-3	21	0852	Day	20	100	0310	15	27			7	13	3
G-4	21	1030	Day	100	85	1122	17	31	9	16	10	19	2
G-5	21	1355	Day	40	60	1305	27	49	6	11	19	35	4
G-6	21	1609	Day	50	80	1656	56	102			23	42	3
H-7	21	2130	Night	40	120	2021	65	119	8	14	16	28	2
H-6	21	2243	Night	60	110	2338	44	80	10	17	20	43	5
H-5	22	0239	Night	90	50	0144	24	44	7	13	14	26	5
H-4	22	0405	Night	50		0454	14	26			11	21	5
H-1	22	1002	Day	20		0910	8	15			5	9	3

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-10	Aug.	EDST											
H-2	22	1105	Day	35		0759	7	13			7	13	2
H-3	22	1155	Day	200		0646	11	20	6	10	9	16	1
J-1	22	1723	Day	30		1806	7	13			6	10	5
J-2	22	1639	Day	50		1931	5	9			6	11*	2
J-3	22	1555	Day	65		2041	8	15	6	11	10	17*	3
J-4	22	2257	Night	90		2213	9	16	7	13	12	21*	2
J-5	23	0047	Night	90		0129	16	29	9	16	17	30	2
J-6	23	0435	Night	70	60	0346	18	33			21	38*	4
J-7	23	0717	Day	50	80	0806	65	119	11	21	22	39	0
K-7	23	1255	Day	30	60	1148	400	732	10	27	16	28	1
K-6	23	1429	Day	50	130	1532	21	38			17	32	4
K-5	23	1818	Day	185	110	1713	17	31	5	9	9	16	5
K-4	23	1957	Night	60	160	2046	14	26	9	16	13	23	7
K-3	23 & 24	2054	Night	30		2242	12	22	8	16	15	27*	10
K-2	24	2156	Night	30		0814	12	22	7	13	14	26*	2
K-1	24	2251	Night	15		0925	9	16	7	13	10	17*	5
L-2	25	0311	Night	80		0243	10	18	7	13	11	20*	4
L-1	25	0355	Night	30		0356	7	13	7	13	14	26*	24
L-3	25	0545	Night	60	50								
L-4	25	0718	Day	30	20								
L-5	25	0859	Day	25	20								
M-1	25	1312	Day	40		2323	8	15			8	14*	6
M-2	25	1407	Day	20		2213	11	20	6	10	10	19	2
M-3	25	1500	Day	50									
M-4	25	1602	Day	30	40								
M-5	25	1708	Day	40	40								

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW: START TIME	PLANKTON NET TOW: LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	MIDWATER TRAWL TOW: START DEPTH		MIDWATER TRAWL TOW: FISHING DEPTH MIN.		MIDWATER TRAWL TOW: FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-10	Aug.	EDST											
N-1	25	2136	Night	75									
N-2	25	2242	Night	90									
N-3	25 & 26	2342	Night	70	90								
N-4	26	0109	Night	70	75								
N-5	26	0232	Night	70	60								
P-5	26	0652	Day	70	90								
P-4	26	0853	Day	40									
P-3	26	1022	Day	75									
P-2	26	1149	Day	50									
P-1	26	1250	Day	20									
D-66-12	Sept.												
M-1	28	1708	Day	40		1754	6	11			4	6	0
M-2	28	2028	Night	30		1927	10	8	5	8	8	14	5
M-3	28	2136	Night	50		2228	17	31	8	14	14	25*	12
M-4	29	0034	Night	75									
M-5	29	0131	Night	50	80								
N-3	29	0635	Dawn	85		1414	14	26			10	19	7
N-2	29	0822	Day	130		1256	13	24			10	19	7
N-1	29	1025	Day	55		1128	10	18	5	9	11	21	1
N-4	29	1608	Day	40	75								
N-5	29	1806	Day	50	50								
L-3	30	0257	Night	70	100	0901	19	35	5	9	15	27	9
L-2	30	0405	Night	65		0721	13	24	7	14	13	23*	6
L-1	30	0506	Night	50		0610	12	22	4	7	7	13	5

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-12	Sept.	EDST											
L-4	30	1150	Day	55	60	1055	25	46	5	9	14	26	10
L-5	30	1331	Day	55	60	1420	360	658	11	21	18	33	1
K-7	30	1950	Night	70	120	1856	119	218	5	9	15	28	3
K-6	30	2116	Night	120	60	2212	28	51	6	11	18	33	5
	Oct.												
K-5	1	0110	Night	75	45	0004	17	31	13	24	15	27	2
K-4	1	0253	Night	85		0341	15	27	8	16	9	17	1
K-1	1	0830	Day	D		0745	9	17			8	14	7
K-2	1	0925	Day	D		0630	12	22			9	17	0
K-3	1	1024	Day	90		0528	13	24	12	22	16	29*	5
J-3	1 & 2	1357	Day	30		1422	9	17	8	16	10	17*	8
J-2	1 & 2	1451	Day	30		1320	5	9	7	14	8	16*	16
J-1	1 & 2	1548	Day	20		1210	7	13	5	8	8	16*	4
J-4	2	1649	Day	120		1602	9	17	9	16	15	27*	3
J-5	2	1823	Dusk	80		1906	14	26	5	8	8	14	1
J-6	2	2225	Night	220	60	2125	19	35	7	12	3	6*	7
J-7	3	0055	Night	30	60	0149	48	88	11	21	16	28	1
H-7	3	0619	Night	50	60	0530	54	99	10	19	16	28	1
H-6	3	0711	Day	85	130	0803	35	64	13	24	21	38	4
H-5	3	1050	Day	40	55	0957	24	44	8	14	14	25	3
H-4	3	1214	Day	65		1304	14	26	10	17	16	28	2
H-1	3	1756	Day	20		1658	7	13	4	6	7	13	5
H-2	3	1852	Night	D		1551	9	17	7	14	10	17*	4
H-3	3	1953	Night	D		1441	15	27	6	11	9	16	0

CRUISE Station	DATE	PLANKTON NET TOW START TIME	LIGHT REGIMEN	PLANKTON VOLUME SHALLOW	PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-12	Oct.	EDST											
G-3	3	2331	Night	110		0451	11	20	9	16	10	19*	11
G-2	4	0048	Night	130		0346	9	17			5	8	5
G-1	4	0143	Night	100		0235	5	9			5	8	4
G-4	4	0727	Day	155		0641	14	26	9	16	15	27	2
G-5	4	0916	Day	105	115	1004	29	53	7	14	14	25	0
G-6	4	1309	Day	230	135	1225	44	81	6	11	12	22	0
F-7	4	1652	Day	60	75	1747	43	79	8	14	15	27	1
F-6	4	2053	Night	120	110	1952	30	55	8	14	22	38	4
F-5	4	2251	Night	70	70	0107	20	37	9	16	13	24	2
F-4	5	0327	Night	65		0241	13	24	7	14	13	24*	6
F-1	5	0822	Day	215		0737	9	17			6	10	4
F-2	5	0920	Day	5		0625	9	17			6	10*	4
F-3	5	1022	Day	45		0508	14	26	5	8	10	19	9
E-3	5	1423	Day	30		1917	11	20	3	5	7	13	6
E-2	5	1515	Day	30		1751	9	17			5	9	0
E-1	5	1601	Day	10		1659	7	13	4	6	6	10	1
D-1	6	0224	Night	30		0135	10	18			5	9	2
D-2	6	0313	Night	60		0033	11	20			5	9	2
D-3	5 & 6	0408	Night	75		2307	14	26			13	23*	8
E-4	11	2134	Night	D		2049	15	27	5	8	14	26*	6
E-5	11	2310	Night	250	140	2358	18	33	9	16	16	28*	9
E-6	12	0250	Night	250	240	0154	22	40	5	9	8	16	1
E-7	12	0452	Night	95	100	0554	36	66	7	13	14	26	3
E-8	12	0903	Day	190	310	0811	66	121	11	21	17	30	2

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-12	Oct.	EDST											
D-8	12	1313	Day	45	65	1401	65	119	9	16	12	22	1
D-7	12	1702	Day	180	245	1556	39	71	11	20	18	32	0
D-6	12	1901	Night	145	100	1958	29	53			14	25	6
D-5	12	2304	Night	20	75	2214	20	37			14	25	2
D-4	13	0036	Night	D	D	0127	12	22	5	8	10	17	2
C-1	13	0921	Day	D		0837	12	22	5	9	7	12	1
C-2	13	1012	Day	65		0740	15	27	5	9	7	14	4
C-3	13	1107	Day	110	100	0641	18	33	5	8	10	17	0
C-4	13	1233	Day	70	70	1319	22	40	5	9	13	23	6
C-5	13	1555	Day	55	60	1505	26	48	10	17	16	28	4
C-6	13	1814	Dusk	420	110	1858	30	55	7	12	19	34	4
C-7	13	2147	Night	140	100	2102	40	73	12	21	31	57	8
C-8	13 & 14	2359	Night	195	75	0045	430	786	6	11	17	31	4
B-7	14	0710	Day	505	80	0619	50	91	8	14	22	39	0
B-6	14	0850	Day	195	145	0945	44	81			14	25	8
B-5	14	1238	Day	105	245	1145	39	71	5	9	13	24	8
B-4	14	1406	Day	485	105	1501	32	59	6	11	9	16	6
B-1	14	1930	Night	20		1854	12	22			6	10	3
B-2	14	2037	Night	60	65	1752	20	37	7	12	11	21	1
B-3	14	2134	Night	55	60	1655	25	46	5	8	10	17	5
A-3	15	0209	Night	D	D								
A-2	15	0309	Night	D	D								
A-1	15	0402	Night	D		0441	5	9			6	10*	5
A-4	15	0715	Day	D	D								
A-5	15	0843	Day	D	D								
A-6	15	1032	Day	D	D								
A-7	15	1226	Day	780	T								

Table II:--Continued

		PLANKTON NET TOW				MIDWATER TRAWL TOW							
				PLANKTON VOLUME		START			FISHING DEPTH				NO. SPECIES
CRUISE Station	DATE	START TIME	LIGHT REGIMEN	SHALLOW	DEEP	TIME	DEPTH		MIN.		MAX.		CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-12	Oct.	EDST											
P-1	20	0834	Day	55									
P-2	20	0931	Day	90									
P-3	20	1100	Day	100									
P-4	20	1233	Day	60	25								
P-5	20	1438	Day	120	60								
D-66-14	Nov.	EST											
E-1	9	2248	Night	40		2157	8	15			5	8	13
E-2	9	2340	Night	80		2049	9	17	4	8	7	12	4
E-3	9 & 10	0040	Night	110		1938	11	20	5	8	7	14*	6
E-4	10	0204	Night	60		0255	15	27	7	12	12	23	7
E-5	10	0538	Night	40	10	0448	21	38	5	9	10	19	2
E-6	10	0722	Day	30	40	0812	22	40	8	14	16	28	2
E-7	10	1200	Day	35	30	1042	35	64	10	17	17	30	2
F-6	10	2303	Night	50	80	2158	30	55	7	14	13	24	2
F-5	11	0126	Night	50	40								
F-4	11	0312	Night	90									
F-2	11	0515	Night	50		0802	11	20	4	7	10	17*	3
F-1	11	0602	Night	50		0656	10	18	4	7	10	17	3
F-3	11	0432	Night	100		0918	15	27	8	14	12	22	2
G-1	11	1604	Day	10		1516	8	15			6	10	6
G-2	11	1657	Night	35		1419	7	13	5	9	8	14*	4
G-3	11	1753	Night	80		1315	11	20	4	7	8	14	0
G-4	11	1919	Night	60		2002	17	31	7	12	14	25	1
G-5	11	2234	Night	155	100	2143	26	48	7	12	12	22	2
G-6	12	0050	Night	50	80	0139	53	97	6	10	15	27	1

Table II:--Continued

CRUISE Station	DATE	PLANKTON NET TOW: START TIME	LIGHT REGIMEN	PLANKTON VOLUME: SHALLOW	PLANKTON VOLUME: DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH: MIN.		FISHING DEPTH: MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-14	Nov.	EST											
H-7	12	0503	Night	90	55								
H-6	12	0609	Dawn	60	50								
H-5	12	0754	Day	190	160								
H-4	12	0918	Day	160									
H-3	12	1041	Day	245		1602	11	20	4	7	6	11	0
H-2	12	1141	Day	30		1503	10	18			5	8	0
H-1	12	1312	Day	25		1355	7	13			5	8	0
J-1	12	2327	Night	50		2234	9	17			7	12	14
J-2	12 & 13	0036	Night	80		2126	6	11			6	10*	5
J-3	13	0202	Night	45		2017	9	17			6	11	1
J-4	14	1348	Day	85		1432	13	24	4	7	8	14	5
J-5	14	1727	Night	190		1635	14	26	5	8	10	19	2
J-6	14	1935	Night	80	100	2026	19	35	7	12	12	22	1
J-7	14	2329	Night	40	60	2239	42	77	6	11	13	24	1
P-5	15	1428	Day	70	80								
P-4	15	1617	Day	95	90								
P-3	15	1753	Night	135									
P-2	15	1906	Night	50		2155	10	18	5	9	8	16	14
P-1	15	1957	Night	40		2045	8	15	5	8	7	14	8
N-5	16	0318	Night	160	65	0415	185	338	5	8	22	40	0
N-4	16	0706	Day	70	90	0610	27	49	7	12	12	22	1
N-3	16	0833	Day	85	80								
N-2	16	0937	Day	125									
N-1	16	1034	Day	40									
M-2	16	1440	Day	140		1728	10	18	7	12	8	16	1
M-1	16	1530	Day	180		1615	7	13			7	12	7

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-14	Nov.	EST											
M-5	16	2248	Night	100	110	2157	52	95	13	24	19	35	10
M-4	16 & 17	2339	Night	110		2055	12	22	6	10	10	17	10
M-3	17	0030	Night	180		1835	17	31			11	19	4
L-3	17	0707	Day	215	205	1125	18	33	6	11	14	25	2
L-2	17	0754	Day	130		1027	14	26	7	14	13	24	5
L-1	17	0838	Day	150		0924	11	20	4	7	6	11	3
L-4	17	1357	Day	135	155	1306	22	40	5	9	10	19	3
L-5	17	1545	Day	70	75	1630	340	622			18	32	1
K-7	17	2127	Night	110	100	2039	173	316	11	21	16	28	3
K-6	17	2236	Night	50	80	2327	22	40	10	19	19	35	2
K-5	18	0155	Night	245	140	0106	19	35			17	31	1
K-4	18	0325	Night	330	220	0415	19	35			10	19	4
K-1	18	0842	Day	20		0759	9	17			7	14	2
K-2	18	0929	Day	30		0653	11	20	7	12	12	22*	2
K-3	18	1022	Day	185		0554	14	26	6	10	11	21	0
F-7	18	2203	Night	70	50	1946	42	77	6	11	14	25	2
E-8	19	0201	Night	150	90								
	Dec.												
D-1	1	1854	Night	400		1947	8	15	2	3	8	14	14
D-2	1	1807	Night	320		2100	11	20	3	6	8	16	8
D-3	1	1714	Night	130		2222	13	24	3	5	6	11	5
D-4	2	0102	Night	110		0017	12	22	4	7	9	16	1
D-5	2	0244	Night	100	110	0332	23	42			8	14	0
D-6	2	0652	Dawn	60	110	0549	28	51			6	10	0
D-7	2	0920	Day	90	80								

Table II:--Continued

CRUISE Station	DATE	START TIME	LIGHT REGIMEN	PLANKTON NET TOW: PLANKTON VOLUME SHALLOW	PLANKTON NET TOW: PLANKTON VOLUME DEEP	MIDWATER TRAWL TOW: START TIME	START DEPTH		FISHING DEPTH MIN.		FISHING DEPTH MAX.		NO. SPECIES CAUGHT
				ml.	ml.		fm.	m.	fm.	m.	fm.	m.	
D-66-14	Dec.	EST											
D-8	2	1117	Day	50	90								
C-8	2	1505	Day	20	10								
C-7	2	1727	Night	105	60								
C-6	2	2022	Night	125	60								
C-5	2	2302	Night	80	90	2350	26	48			4	6	1
C-4	3	0412	Night	65	70	0400	22	40	4	8	6	10	2
C-2	3	0645	Dawn	50		0701	13	24	7	13	9	16	1
C-1	3	0751	Day	60		0810	11	20	8	14	10	17	1
C-3	3	0537	Night	70		0545	18	33	7	13	10	19	8
C-3	3	1047	Day		100	0545	18	33	7	13	10	19	8
B-1	3	1937	Night	95		1712	10	18			5	8	9
B-2	3	2056	Night	95	125	1820	16	29	6	10	11	20	1
B-3	3	2210	Night	90	110	1942	23	42	7	13	12	21	2
B-4	3	2351	Night	80	90	2128	33	60	6	11	12	22	2
B-5	4	0113	Night	80	80								
B-6	4	0310	Night	80	75								
B-7	4	0517	Night	50	50								
A-7	4	1044	Day	40	45								
A-6	4	1255	Day	50	45								
A-5	4	1449	Day	40	55								
A-4	4	1618	Dusk	60	60								
A-3	4	1750	Night	70	55	2318	19	35	8	14	10	19	1
A-2	4	1857	Night	40		2210	18	33	4	7	5	8	2
A-1	4	1956	Night	35		2058	5	9			5	9*	4

Table III:--R. V. Dolphin survey, 1965-66. Midwater trawl collections records

The collections are arranged in phylogenetic order by family.

Capture records for each species are listed under the appropriate cruise numbers (italicized) in the following sequence: the station of capture; the number of specimens taken at that station or their weight (indicated by lb); and the length or range of lengths.

Measurements are expressed as millimeters fork length unless followed by (TL) which indicates that total length was used. Fishes smaller than 50 millimeters were usually measured to the nearest 0.5 millimeters while those 50 millimeters and larger were measured to the nearest millimeter.

Some specimens of secondary interest which were counted, measured, and discarded at sea without specific identification are designated by (D). Fishes designated by NMD were not measured but were identified and discarded at sea. The notation (mut.) indicates accurate measurement was impossible due to mutilation of the specimen.

Table III:--R. V. Dolphin survey, 1965-66. Midwater trawl collection records

CARCHARIIDAE
Carcharias taurus Rafinesque
sand shark
D-66-5
K-2, 1, NMD

CARCHARHINIDAE
Carcharhinus milberti (Müller and Henle)
sandbar shark
D-66-12
H-1, 1, 793 (TL)
J-1, 1, 667 (TL
J-2, 1, 1035 (TL)

Mustelus canis (Mitchill)
smooth dogfish
D-66-5
H-1, 1, 675 (TL)
J-1, 10, NMD
D-66-12
A-1, 1, 441 (TL)
G-1, 1, 525 (TL)
D-66-14
K-2, 1, ca.420 (TL)

SQUALIDAE
Squalus acanthias Linnaeus
spiny dogfish
D-65-4
K-4, 1, 725 (TL)
D-66-3
MWT-1, 2, 800-920 (TL)
MWT-2, 6, NMD
D-66-5
H-5, 1, 273 (TL)
H-7, 6, NMD
D-66-7
A-6, 60, 240-539 (TL)
A-7, 4, NMD
H-6, 1, 256 (TL)
J-6, 2, NMD
D-66-10
E-1, 6, 340-375 (TL)
F-1, 3, NMD
F-2, 129, NMD
D-66-12
A-1, 1, 810 (TL)
D-6, 1, 276 (TL)

Squalus acanthias Linnaeus (Cont.)
D-66-14
C-3, 1, 689 (TL)
E-1, 1, 681 (TL)
J-1, 1, 874 (TL)

TORPEDINIDAE
Torpedo nobiliana Bonaparte
Atlantic torpedo
D-66-5
J-1, 1, ca.1000 (TL)

RAJIDAE
Raja eglanteria Bosc
clearnose skate
D-66-5
L-3, 12, 412-476 (TL)
D-66-10
F-1, 10, NMD
F-2, 1, NMD
L-1, 4, 120-131 (TL)
K-1, 1, NMD
K-3, 10, NMD
D-66-12
H-2, 1, NMD
J-2, 3, 507-600 (TL)

R. erinacea Mitchill
little skate
D-66-3
MWT-2, 1, 228 (TL)
D-66-10
E-3, 3, NMD
F-2, 3, NMD
D-66-12
A-1, 1, 486 (TL)
D-3, 6, NMD
E-4, 1, 402 (TL)
J-6, 2, 264-471 (TL)

R. ocellata Mitchill
winter skate
D-66-12
D 3, 1, 464 (TL)

R. radiata Donovan
thorny skate
D-66-5
J-1, 9, NMD

Unidentified
D-66-10
C-2, 2(larvae, NM-84 (TL)
D-66-12
E-5, 1, NMD
D-66-14
K-2, 1, NMD

DASYATIDAE
Dasyatis sayi (LeSueur)
bluntnose stingray
D-66-12
J-2, 1, 414 (TL)

Dasyatis sp.
D-66-5
M-1, 1, NMD

MYLIOBATIDAE
Myliobatis freminvillei LeSueur
bullnose ray
D-66-5
M-1, 1, NMD
D-66-12
G-3, 1, 550 (TL)
J-2, 1, 686 (TL)

Rhinoptera bonasus (Mitchill)
cownose ray
D-66-7
L-1, 2, NMD
D-66-12
J-3, 1, 702 (TL)

ELOPIDAE
Elops saurus Linnaeus
ladyfish
D-66-5
L-2, 1, 26 (TL)
D-66-14
M-5, 1, 33 (TL)

Unidentified
D-66-14
M-1, 1, ca.33 (TL)(mut.)

ALBULIDAE
Albula vulpes (Linnaeus)
bonefish
D-66-14
M-4, 1, 39 (TL)

CLUPEIDAE
Alosa aestivalis (Mitchill)
blueback herring
D-66-3
MWT-2, 1, 97
D-66-5
E-1, 66, 77-106 1/
E-2, 6, 83-92
E-3, 1, 171
E-4, 11, 166-252
F-1, 3, NMD
F-2, 52, NMD
F-3, 3, 84-94
F-6, 2, NMD
D-66-10
F-1, 5, 132-146
F-2, 79, ca.150
H-5, 4, ca.22 (TL)
L-1, 4, NMD
M-1, 10, 55-101
D-66-12
K-1, 3, 154-163
M-2, 1, 105
D-66-14
B-1, 3, 154-163
C-3, 3, 178-240
D-1, 24, 85-268
D-2, 27, 85-221
D-3, 29, 156-188

Alosa pseudoharengus (Wilson)
alewife
D-66-5
E-1, 3, 128-143 1/
D-66-14
B-1, 1, 137
D-1, 4, 134-230
E-1, 4, 74-140

Brevoortia tyrannus (Latrobe)
Atlantic menhaden
D-66-5
E-1, 2, 305-361
D-66-7
L-1, 7, 138-157
L-2, 47, NMD
D-66-10
H-1, 1, 25 (TL)
H-2, 2, 21.0-24.5 (TL)
H-6, 4, (mut.)
K-4, 1, 23.0 (TL)
J-6, 2, 35.0-37.0 (TL)

1/ 200 lbs. clupeiforms captured: 83 fish saved; 66 Alosa aestivalis, 3 A. pseudoharengus, 14 Anchoa mitchilli.

Brevoortia tyrannus (Latrobe) (Cont.)
D-66-14
B-1, 1, 112
D-1, 3, 22(TL) & 120-137
E-1, 1, 125
E-4, 1, 89
J-1, 12, 126-177
J-4, 1, 160

Clupea harengus harengus Linnaeus
Atlantic herring
D-66-12
F-1, 5, 145-160
F-2, 1, 143
D-66-14
A-1, 4, 210-245
B-2, 4, 247-298
C-1, 1, 280
D-1, 2, 285-285
D-2, 22, 229-287
D-3, 6, 208-264

Etrumeus sadina (Mitchill)
Atlantic round herring
D-66-5
N-1, 1, 98
D-66-7
J-5, 5, NMD
L-1, 300, 64-76
L-2, 250, NMD
L-3, 17, 83-100
P-1, 2, 66-67
P-3, ca.300, NMD
P-4, 1, 124
D-66-10
C-2, 1, 154
C-3, 2, 150-155
E-1, 11, 105-120
E-2, 7, 112-118
F-2, 14, 120-163
G-1, 44, 105-115
G-2, 241, 108-119
G-3, 2, NMD
G-4, 1, 109
J-1, 2, 78-104
J-2, 1, NMD
J-3, 2, 103-108
L-1, 9, 92-102

Etrumeus sadina (Mitchill) (Cont.)
D-66-12
E-3, 2, 136 & (mut.)
F-3, 3, 120-130
F-5, 1, 135
G-3, 16, 120-125
J-3, 10, 88-111[2/]
K-1, 5 lbs., 99-116
L-1, 1, 101
D-66-14
E-3, 1, 121
E-4, 2, 136-138
J-1, 1, 122
J-2, 12, 112-126
J-3, 1, 121
P-1, 2, 106-108
P-2, 154, 102-122

Opisthonema oglinum (LeSueur)
Atlantic thread herring
D-66-7
P-2, 10, 140-162
P-3, 1, 146

Sardinella anchovia Valenciennes
Spanish sardine
D-66-10
L-1, 1, 72
D-66-12
K-1, 1, 125

ENGRAULIDAE
Anchoa hepsetus (Linnaeus)
striped anchovy
D-66-5
E-2, 1, 80
F-1, 44, 64-85
F-4, 1, 75
H-1, 2, ca.60
J-1, ca.100, 107-111
J-2, 1, NMD
K-1, 152, NMD
M-1, 10, 98-118
D-66-7
M-1, 10, NMD
P-1, 29, 91-112
P-2, 110, 62-111

2/ 50 lbs. clupeiforms captured: 35 fish saved; 10 Etrumeus sadina, 25 Anchoviella eurystole.

Anchoa hepsetus (Linnaeus) (Cont.)

D-66-10

E-1, 6, ca. 100-120
F-2, ca.2000, ca.40-120
G-1, 12, 102-119
J-1, ca.6000, 70-115
M-1, 221, 48-80

D-66-12

F-1, 2 lbs., 120-140
F-3, 3, 111-119[3]
G-3, 2, 124-124
H-1, 1, 107[4]
H-2, 43 lbs., 92-110
J-1, 3, 72-120[5]
J-2, 8, 73-108[6]
K-1, 8, 85-111[7]
L-1, 222, 63-105
M-2, 10, 84-101
M-3, 3, 23.5-(TL)-96.0

D-66-14

G-1, 2, 118-126[8]
M-3, 2, 21-24 (TL)
P-1, 250, 99-127
P-2, 57, 106-127

Anchoa mitchilli (Valenciennes)
bay anchovy

D-66-5

E-1, 14, 58-86[1]

Anchoa mitchilli (Valenciennes)(Cont.)

D-66-10

E-1, 13, ca.50-70
G-1, 31, 37-75

D-66-12

B-1, 19, 29-84
D-1, 77, 51-76[9]
E-3, 10, 58-86[10]
F-3, 7, 44-79[3]
H-1, 30, 55-74[4]
J-1, 187, 40-79[5]
J-2, 10, 58-74[6]

D-66-14

D-1, 3, 44-53
E-1, 7.5 lbs., 39-83
E-2, 8.75 lbs., 44-86
F-1, 19 lbs., 42-80
G-1, 7, 45-83[8]

Anchoviella eurystole (Swain & Meek)
silver anchovy

D-66-7

L-3, 9, 95-108
P-3, 6, 23.5-44.5 (TL)
P-2, 2, 34-36

3/ 22 lbs. engraulids captured: 10 fish saved; 3 Anchoa hepsetus. 7 A. mitchilli.

4/ Ca. 100 lbs. engraulids captured: 31 fish saved; 1 Anchoa hepsetus, 30 A. mitchilli.

5/ 56 lbs. engraulids captured: 190 fish saved; 3 Anchoa hepsetus, 187 A. mitchilli.

6/ 23 lbs. engraulids captured: 18 fish saved, 8 Anchoa hepsetus, 10 A. mitchilli.

7/ 8 lbs. engraulids captured: 10 fish saved; 8 Anchoa hepsetus, 2 Anchoviella eurystole.

8/ 2 lbs. engraulids captured: 9 fish saved; 2 Anchoa hepsetus, 7 A. mitchilli.

9/ 200 engraulids captured: 83 saved; 77 Anchoa mitchilli, 6 Anchoviella eurystole.

10/ Ca. 500 engraulids captured: 10 saved; 10 Anchoa mitchilli.

Anchoviella eurystole (Swain & Meek)(Cont.)

D-66-10

E-1, 4, ca.120
E-2, 23, 109-122
G-1, 1, 77
G-2, 64, 110-121
M-1, 17, 50-79

D-66-12

D-1, 6, 40-46[9/]
E-1, 16, 17.0-41.5 (TL)
G-2, 9, 33-42 (TL)
G-3, 26, 114-128
G-4, 1, 121
J-3, 25, 98-109[2/]
K-1, 2, 78-90[7/]
M-2, 15, 76-96

D-66-14

J-2, 8 lbs., 115-117

Anchoviella sp.

D-66-12

B-5, 3, 22-25 (TL)
C-2, 52, 16.0-30.5 (TL)
H-6, 4, 11-19 (TL)
L-3, 142, ca.10-20 (TL)
M-3, 1, 40 (TL)
N-2, 9, 13-40 (TL)

D-66-14

D-1, 1, 34 (TL)
D-2, 1, 42.5 (TL)
G-2, 17, 32-41 (TL)
K-1, 45, 17-38 (TL)
L-1, 3, 30-37 (TL)
L-2, 8, 23-36 (TL)
M-1, 20, 16-31 (TL)
M-3, 1, 33 (TL)
M-4, 7, 19.5-43.0 (TL)

Unidentified

D-66-10

E-4, ca.500, NMD
F-1, ca.300, NMD
J-2, 7, NMD
L-1, ca.5000, NMD
M-2, 25, 56-98 (D)

D-66-12

C-7, 1, 41 (TL)
F-2, 10 lbs., NMD
G-1, 12 lbs., 62-125 (D)
G-2, 3 lbs., NMD
L-4, 2, 39-41 (TL)

Unidentified (Cont.)

D-66-14

F-2, 5 lbs., NMD
G-2, 120, NMD
J-1, 14 lbs., NMD
M-5, 6, 17-37 (TL)

SYNODONTIDAE

Saurida brasiliensis Norman
largescale lizardfish

D-66-14

M-4, 1, 34 (TL)

MYCTOPHIDAE

Aethoprora sp.

D-66-12

C-8, 2, 40.5-49.0

Centrobranchus sp.

D-66-12

C-8, 3, 21.0-21.5

Lampadena sp.

D-66-12

K-7, 140, ca.60-70

D-66-14

K-7, 40, 62-76

Myctophum sp.

D-65-4

L-5, 5, 67-75

D-66-12

C-8, 12, 49.0-60.5

D-66-14

K-7, 16, 50-68

Unidentified

D-66-7

C-8, 1, 34.5 (TL) (D)

D-66-14

K-7, 11, 30-46 (TL)

ANGUILLIFORMES

Leptocephali (Unidentified)

D-66-5

C-7, 1, 102

D-66-7

P-3, 1, 60.5

Leptocephali (Unidentified)(Cont.)
D-66-10
A-4, 1, 86
A-5, 2, 74-87
B-4, 1, 79
K-4, 12, 47-93
K-5, 3, 39.5-82
M-1, 1, 57
D-66-12
B-3, 1, 90.5
B-4, 2, 42-103.5
B-5, 1, 83
B-6, 1, 103
C-5, 1, 85
L-2, 1, 87
L-3, 43, 46-110 & 4, ca.25
L-4, 13, ca.50-80
M-2, 1, 76
M-3, 17, ca.60-90
N-2, 11, 51-98
D-66-14
L-1, 1, 60
M-1, 4, 25-64
M-4, 5, 43.0-63.5
M-5, 5, 54-62
P-1, 2, 57-63
P-2, 2, 56.5-63.5

SCOMBERESOCIDAE
Scomberesox saurus (Walbaum)
Atlantic saury
D-66-10
C-2, 1, 285

BELONIDAE
Strongylura marina (Walbaum)
Atlantic needlefish
D-65-4
N-2, 1, 554 (TL)
D-66-12
H-1, 1, 298
D-66-14
P-2, 1, 285

HEMIRAMPHIDAE
Hemiramphus brasiliensis (Linnaeus)
ballyhoo
D-66-5
K-3, 1, 332
D-66-10
J-4, 1, 157

GADIDAE
Enchelyopus cimbrius (Linnaeus)
fourbeard rockling
D-66-7
C-3, 2, 27.5-32.0 (TL)
C-4, 1, 25.5 (TL)
C-5, 4, 26.0-32.5 (TL)
C-6, 2, 22.0-27.0 (TL)
D-6, 2, 24.0-25.0 (TL)
K-4, 1, 40.5 (TL)
D-66-12
B-5, 1, 11.5 (TL)
C-4, 1, 6.5 (TL)

Melanogrammus aeglefinus (Linnaeus)
haddock
D-66-7
C-4, 4, 20.5-26.0 (TL)
C-5, 5, 19.0-36.0 (TL)
D-6, 7, 27.5-29.5 (TL)

Merluccius bilinearis (Mitchill)
silver hake
D-66-3
MWT-2, 4, 71-123
D-66-5
E-1, 1, 239 (TL)
E-3, 11, 73-129
E-4, 4, 88-147
E-5, 1, 435 (TL)
F-1, 7, 76-134
F-2, 220, 78-159
F-5, 3, 109-240 (TL)
J-1, 72, NMD
J-2, 34, NMD
K-1, 2, 158-159
D-66-7
C-3, 35, 36-210 (TL)
L-1, 2, 163-171 (TL)
D-66-10
B-7, 6, 19.5-25.5 (TL)
C-2, 42, 170-260 (TL)
C-3, 8, 173-245 (TL)
D-5, 1, 180 (TL)
D-6, 6, 158-187
D-7, 1, 15.5 (TL)
E-1, 1, 143 (TL)
E-3, 1, 235 (TL)
F-2, 30, 106-230
H-6, 2, 21-24 (TL)

Merluccius bilinearis (Mitchill)(Cont.)
D-66-12
B-1, 1, 65 (TL)
B-4, 1, 19.5 (TL)
B-5, 29, 9.5-28.0 (TL)
B-6, 32, 14.5-38.0 (TL)
C-6, 8, 13-57 (TL)
C-7, 110, 13.0-51.5 (TL)
D-6, 4, 32.0-39.5 (TL)
E-3, 7, 49-75 (TL)
E-4, 19, 34.5-52.0 (TL)
E-5, 10, 28.0-61.5 (TL)
F-3, 3, 198-232
F-6, 19, 22.5-45.0 (TL)
G-3, 1, 276
D-66-14
B-1, 4, 80-318
B-3, 13, 21-61 (TL)
B-4, 4, 33-50 (TL)
C-3, 8, 49.5-82.0 (TL)
C-4, 2, 34-41 (TL)
D-1, 11, 272-370
D-2, 24, 54-379
D-3, 1, 328
E-1, 14, 28-115
E-2, 2, 71-111
E-3, 3, 33-77
E-4, 33, 30.5-76.0 (TL)
F-6, 41, 32.5-60.0 (TL)
F-7, 3, 36-45 (TL)
G-5, 35, 38-60
K-5, 1, 41 (TL)

Urophycis chuss (Walbaum)
squirrel hake
D-66-5
H-5, 1, 238 (TL)
J-2, 2, NMD
D-66-10
C-2, 5, 117-296 (TL)
F-2, 1, 257
K-3, 1, 64.5 (TL)
D-66-12
B-4, 4, 13.0-24.0 (TL)
B-5, 52, 11.5-43.0 (TL)
B-6, 7, 13-33 (TL)
C-4, 3, 8-24 (TL)
C-5, 1, 17.0 (TL)
C-7, 6, 11.5-38.5 (TL)
D-3, 5, 49-81 (TL)
E-5, 7, 30.5-49.0 (TL) & 2, 258-348
E-7, 1, 45 (TL)
H-6, 1, 9.0 (TL)
J-6, 8, 32.5-62.0 (TL)

Urophycis chuss (Walbaum)(Cont.)
D-66-14
A-1, 1, 52.5 (TL)
C-3, 1, 40 (TL)

U. regius (Walbaum)
spotted hake
D-65-4
H-6, 1, 31 (TL)
K-4, 1, 24
D-66-3
MWT-2, 2, 74-85
D-66-5
J-1, 43, NMD
J-2, 90, 125-227 (TL)
J-3, 1, 56 (TL) & 3, NMD
J-4, 1, 164 (TL)
K-1, 12, 74-205 (TL)
L-3, 163, 58-182 (TL)
M-1, 6, 106-147 (TL)
D-66-7
K-5, 3, 110-120 (TL)
D-66-10
F-1, 4, 238-303
F-2, 3, 146-210
G-2, 7, 168-264 (TL)
K-3, 48, 167-250 (TL)
L-1, 3, 190-204
D-66-12
E-4, 1, 283
G-3, 1, 238
J-6, 34, 188-269
D-66-14
B-1, 1, 44
J-5, 11, 16.5-29.5 (TL)
K-4, 2, 21.0-32.5 (TL)

U. tenuis (Mitchill)
white hake
D-66-3
MWT-2, 3, 435-447 (TL)

GASTEROSTEIDAE
Apeltes quadracus (Mitchill)
fourspine stickleback
D-66-14
D-1, 1, 50

Gasterosteus aculeatus Linnaeus
threespine stickleback
D-66-14
A-2, 1, 58
B-1, 1, 51

FISTULARIIDAE

Fistularia tabacaria Linnaeus
cornetfish
D-66-7
P-2, 1, 112 (TL)
D-66-12
N-2, 2, 45-49
N-3, 1, 103

SYNGNATHIDAE

Hippocampus obtusus Ginsburg
offshore seahorse
D-65-4
H-6, 1, 51
D-66-7
A-1, 1, NMD
D-66-10
H-4, 4, NMD
K-6, 1, 45
D-66-12
C-4, 1, 17
D-4, 2, NMD
E-4, 4, ca.18-20
E-5, 1, NMD
F-4, 1, NMD
F-6, 1, 47
H-5, 1, NMD
J-6, 1, 14
K-6, 2, 18-29
D-66-14
C-3, 8, NMD
E-4, 1, 18
G-1, 1, 29
G-4, 1, NMD
J-1, 1, 22.5
M-2, 1, NMD

Syngnathus fuscus Storer
northern pipefish
D-66-10
L-1, 1, 247 (TL)
D-66-14
B-1, 1, 152

S. pelagicus Linnaeus
sargassum pipefish
D-66-14
A-2, 4, 137-173
C-3, 1, 99
D-1, 2, 153-176
D-2, 3, 147-192

Unidentified pipefish
D-65-4
F-3, 1, 215 (TL) (D)
D-66-14
E-1, 2, 131-156 (D)
P-1, 2, 268-290 (D)
P-2, 2, NMD

SERRANIDAE

Centropristes striatus (Linnaeus)
black sea bass
D-66-5
M-1, 1, 95
D-66-10
K-3, 2, 193-196
L-1, 4, 115-179
D-66-12
J-2, 3, 190-198
K-3, 1, 148
D-66-14
J-1, 1, 196

C. philadelphicus (Linnaeus)
rock sea bass
D-66-10
K-3, 1, 35.5 (TL)

Roccus americanus (Gmelin)
white perch
D-66-5
F-2, 1, 166

LUTJANIDAE

Unidentified
D-66-12
K-6, 1, 39
L-4, 1, 46
N-3, 1, 35

PRIACANTHIDAE

Pristigenys alta (Gill)
short bigeye
D-66-12
N-3, 1, 21.5 (TL)

Unidentified
D-66-12
C-7, 1, 12.5 (TL)

POMATOMIDAE

Pomatomus saltatrix (Linnaeus)
bluefish
D-66-7
C-2, 1, 42 (TL)
L-1, 1, 45.5 (TL)
D-66-10
H-4, 3, 14-16 (TL)
H-5, 3, 16-16.5 (TL) & 1, (mut.)
J-1, 1, 128
D-66-12
G-2, 12, 183-219 & 5, 33-51 (TL)
D-66-14
J-1, 1, 124
L-2, 1, 54

CARANGIDAE

Caranx bartholomaei Cuvier
yellow jack
D-66-12
L-4, 1, 18.5 (TL)

C. crysos (Mitchill)
blue runner
D-66-12
L-2, 1, 116
L-4, 1, 114

Chloroscombrus chrysurus (Linnaeus)
bumper
D-66-14
M-4, 3, 22-29

Decapterus macarellus (Cuvier)
mackerel scad
D-66-12
E-3, 1, 112

D. punctatus (Agassiz)
round scad
D-65-4
N-5, 2, 23-36
D-66-7
M-3, 1, 37 (TL)

D. punctatus (Agassiz)(Cont.)
D-66-12
D-2, 1, 110
D-6, 1, 55
G-3, 2, 106-112
K-5, 1, 83
K-7, 1, 47
L-2, 2, 56-64
L-4, 3, 69-80
M-3, 1, 105
N-1, 84, 20-47
D-66-14
J-2, 1, 58
K-1, 1, 64.5 (TL)
K-4, 1, 67
K-6, 1, 64.5
L-2, 4, 61-69
L-4, 4, 59-75
M-4, 1, 72
M-5, 2, 48-57

Selar crumenophthalmus (Bloch)
bigeye scad
D-66-7
M-2, 1, 21.5
M-3, 7, 20.5-28.0 (TL)
M-4, 1, 17.5 (TL)
N-4, 10, 16.5-33.0 (TL)
P-3, 1, 25.5 (TL)
D-66-10
K-2, 1, 41.5 (TL)
D-66-12
F-3, 5, 136-154
G-2, 2, 147-151
J-2, 1, 162
K-1, 1, 85
D-66-14
N-4, 1, 36.5

Selene vomer (Linnaeus)
lookdown
D-66-7
P-2, 1, 29
D-66-10
L-1, 1, 44

Selene vomer (Linnaeus)(Cont.)
D-66-12
K-1, 1, 44
K-6, 1, 48
L-3, 7, 15-22 (TL)
L-5, 1, 15
M-2, 1, 24 (TL)
M-3, 1, 22 (TL)
N-2, 4, 15.0-26.5
N-3, 4, 19.5-27.0
D-66-14
E-1, 1, 51
P-1, 1, 49
P-2, 33, 40-72

Seriola zonata (Mitchill)
banded rudderfish
D-66-7
L-1, 1, 112

Trachurus lathami Nichols
rough scad
D-66-7
P-1, 2, 103-108
P-2, 10, 88-114
P-3, 5, 67-105
D-66-10
E-1, 1, 75
L-1, 8, 117-136
M-1, 12, 124-136
D-66-12
M-3, 2, 123-132
D-66-14
J-2, 3, 132-141

POMADASYIDAE
Orthopristis chrysopterus (Linnaeus)
pigfish
D-66-5
H-1, 1, 155
J-1, 2, 147-179

SCIAENIDAE
Bairdiella chrysura (Lacépède)
silver perch
D-66-14
E-1, 17, 94-130
G-1, 2, 131-131
J-1, 21, 90-149
J-4, 1, 145
P-2, 15, 146-183

Cynoscion regalis (Bloch & Schneider)
weakfish
D-66-5
J-1, 19, 134-255
M-1, 29, 129-162
D-66-7
L-1, 1, 202
D-66-10
F-1, 520, 75-176
F-2, 2, 164-165
L-1, 10, 83-240
D-66-12
F-1, 256, 120-165
F-2, 330, 128-175
F-3, 39, 153-220
G-1, 114, 136-245
J-2, 4, 196-211
D-66-14
E-1, 13, 128-255
F-1, 1, 231
F-2, 5, 174-247
F-3, 1, 191
G-1, 60, 130-239
J-1, 126, 131-170
P-2, 7, 121-211

Leiostomus xanthurus Lacépède
spot
D-66-7
P-2, 1, 140
D-66-10
K-1, 5, 156-165
L-1, 44, 100-162
D-66-12
J-2, 38, 120-181
J-3, 2, 128-188
D-66-14
J-1, 3, 126-151
P-2, 1, 168

Menticirrhus americanus (Linnaeus)
southern kingfish
D-66-14
J-1, 1, 195

M. littoralis (Holbrook)
gulf kingfish
D-66-5
M-1, 1, 154

M. saxatilis (Bloch & Schneider)
northern kingfish
D-66-12
J-2, 14, 153-188

Micropogon undulatus (Linnaeus)
Atlantic croaker
D-66-5
M-1, 1, 124
D-66-10
L-1, 204, 106-209
D-66-12
J-3, 3, 199-208
M-3, 2, 225-238
D-66-14
P-2, 1, 18.5 (TL)

MULLIDAE
Mullus auratus Jordan & Gilbert
red goatfish
D-66-7
P-3, 1, 44.5 (TL)

SPARIDAE
Stenotomus chrysops (Linnaeus)
scup
D-65-4
K-6, 1, 164
D-66-3
MWT-2, 15, 223-296 (TL)
D-66-5
E-1, 5, 92-109
F-2, 7, NMD
H-1, 83, 81-121
H-2, 19, 102-191
H-4, 1, NMD
J-2, 34, 61-120
K-1, 1, 100
D-66-7
L-1, 117, 25-133
L-2, 3, 123-125
P-2, 4, 52-81
P-3, 109, 44-236
D-66-10
G-2, 3, 94-141
J-3, 1, 102
K-2, 3, ca.80
L-1, ca.250, ca.80-120
L-2, 65, 80-112

Stenotomus chrysops (Linnaeus)(Cont.)
D-66-12
A-1, 22, 39.5 (TL)-97
J-2, 56, 90-138
J-4, 1, ca.130
K-3, 9, 110-130
L-1, 2, 113-114
L-2, 83, 94-122
D-66-14
L-2, 1, 121
L-3, 1, 116
M-3, 11, 109-129
P-2, 1, 118

CHAETODONTIDAE
Holacanthus sp.
angelfish
D-66-14
M-5, 1, 26

Unidentified
D-66-12
L-4, 1, 13.5 (TL)
M-3, 1, 18.0 (TL)

LABRIDAE
Tautogolabrus adspersus (Walbaum)
cunner
D-66-7
A-1, 1, 119 (TL)

ACANTHURIDAE
Acanthurus sp.
surgeonfish
D-66-14
M-1, 2, 7-10 (TL)

TRICHIURIDAE
Trichiurus lepturus Linnaeus
Atlantic cutlassfish
D-66-14
P-1, 5, 332-410 (TL)
P-2, 4, 120-170 (TL)

SCOMBRIDAE
Auxis thazard (Lacépède)
frigate mackerel
D-66-10
H-7, 1, 18.5 (TL)
K-4, 1, 19.5 (TL)

Scomber scombrus Linnaeus
Atlantic mackerel
D-65-4
F-3, 1, 295
D-66-5
E-4, 3, 189-205
E-5, 38, 184-218
E-6, 15, 176-213
D-66-7
C-5, 10, 12.0 (TL)-23.5
C-6, 3, ca.14 (TL)
D-6, 10, 14.0-22.0 (TL)
H-5, 19, 32-49
J-5, 5, 35.5-45.0 (TL)
K-5, 2, 41.5-43.0 (TL)
D-66-10
A-3, 3, 223-243
C-2, 6, 110-126
C-3, 47, 104-132
C-4, ca.3000, 102-130
C-6, 5, 103-126
C-7, 2, 108-126
D-4, 1, 111
E-1, 1, 140
F-1, 8, ca.140
F-2; 637, 120-157
G-2, 1, 145
H-4, 1, NMD
D-66-12
B-1, 1, 146
E-3, 1, (mut.)
F-3, 3, 146-151
D-66-14
D-2, 1, 147
E-1, 1, 149
E-3, 1, 172
E-4, 1, 150

Unidentified
D-66-7
M-4, 3, 15.0-20.0 (TL)
M-5, 3, 13.5-17.5 (TL)
D-66-10
K-3, 1, 19.5
K-4, 1, 17.0 (TL)
D-66-12
L-3, 4, 15.5-22.0 (TL)
L-5, 1, 19.5
M-3, 2, 15.5-20.5 (TL)
D-66-14
M-1, 1, 19.5 (TL)

TRIGLIDAE
Prionotus carolinus (Linnaeus)
northern searobin
D-66-3
MWT-1, 1, 205
MWT-2, 17, 237-285
H-5, 27, NMD
D-66-5
F-1, 1, NMD
G-3, 1, 230
H-1, 8, 170-380 (TL)
H-2, 49, NMD
H-4, 3, NMD
H-5, 1, 187 (TL)
J-2, 4, NMD
J-3, 20, NMD
J-4, 15, NMD
K-2, 1, NMD
L-3, 3, NMD & 1, 111 (TL)
D-66-7
B-1, 4, 130-230 (TL)
B-2, 1, 192 (TL)
B-3, 2, 100-239 (TL)
P-2, 1, 100
D-66-10
F-1, 9, NMD
F-2, 2, NMD
G-2, 45, NMD
K-3, 16, NMD
L-1, 8, 47-146 (TL)
D-66-12
A-1, 6, 71-95 (TL)
L-2, 1, 136 (TL)
D-66-14
J-4, 1, 86

P. evolans (Linnaeus)
striped searobin
D-65-4
F-5, 1, 135 (TL)
D-66-5
E-1, 30, NMD & 1, 311 (TL)
F-1, 1, NMD
H-2, 17, NMD
H-3, 3, NMD
J-2, 1, NMD
J-3, 1, NMD
D-66-10
E-1, 7, 255-340 (TL)
E-2, 8, 203-291

P. evolans (Linnaeus)(Cont.)
D-66-14
B-1, 2, 111-127
D-1, 1, 172
E-1, 2, 39-50
E-3, 11, 24.5-33.0 (TL)
E-4, 1, 56.5 (TL)

Unidentified
D-66-7
P-2, 2, 17.5-18.0
P-3, 52, 19.0-44.0 (TL)
D-66-12
D-3, 32, NMD
F-3, 1, 225 (TL)
F-4, 8, 185-260
G-3, 6, NMD
G-4, 1, NMD
H-2, 2, 222-227 (TL)
J-2, 1, 284
J-4, 2, 254-282 (TL)
K-3, 1, 161 (TL)
D-66-14
E-3, 11, 24.5-33.0 (TL)

COTTIDAE
Myoxocephalus octodecemspinosus (Mitchill)
longhorn sculpin
D-66-5
C-6, 1, 96
D-66-14
A-1, 2, 254-260 (TL)
D-1, 1, 301

CYCLOPTERIDAE
Liparis atlanticus (Jordan & Evermann)
seasnail
D-66-12
A-1, 1, 33 (TL)

URANOSCOPIDAE
Astroscopus guttatus Abbott
northern stargazer
D-66-10
H-1, 1, 11.5 (TL)

ZOARCIDAE
Macrozoarces americanus (Bloch & Schneider)
ocean pout
D-66-12
E-5, 1, 170 (TL)

OPHIDIIDAE
Ophidion sp.
cusk eel
D-66-10
K-3, 14, 74-109 (TL)

Unidentified
D-66-12
L-3, 1, 15.5 (TL)

STROMATEIDAE
Cubiceps sp.
D-66-12
L-4, 1, 34.5 (TL)

Peprilus paru (Linnaeus)
northern harvestfish
D-66-10
L-1, 1, 79
D-66-14
J-1, 1, 72

Poronotus triacanthus (Peck)
butterfish
D-65-4
C-7, 1, 63
E-8, 1, NMD
F-3, 53, 72-187
F-5, 8, 107-154 (TL)
F-6, 5, 97-163
G-3, 6, 81-99
G-4, 5, 108-144
H-6, 1, 129
J-5, 4, 68-80
J-6, 1, 62
K-3, 16, 76-139
K-5, 1, 77
D-66-5
E-1, 70 lbs., 171-196
E-5, 2, 159-184
F-1, 29, NMD
F-2, 138, NMD
F-4, 1, 106
F-6, 1, NMD
H-1, 185, NMD
H-2, 130, 98-150
H-3, 2, NMD
J-1, 2, NMD
J-2, 54, NMD
K-1, 64, 54-132
L-1, 12, 83-106
L-2, 2, 14-22
M-1, 104, 42-123
N-3, 1, 16

Poronotus triacanthus (Peck)(Cont.)

D-66-7

C-5, 1, 49
D-66, 2, 19.5-54.5 (TL)
J-5, 5, 27.0-50.5 (TL)
J-6, 1, 144
K-4, 118, 108-165
K-4, 94, 13.0-56.0
K-5, 15, 12.5 (TL)-140
L-1, 108, 37.5 (TL)-125
L-2, 14, 98-123
L-3, 1, 34
L-5, 2, 18.0-24.5 (TL)
M-2, 1, 18.5 (TL)
P-2, 52, 82-115
P-3, 1, 91

D-66-10

A-3, 4, 155-174
B-5, 1, 64
B-6, 130, 16.5 (TL)-129
B-7, 9, 13.0 (TL)-134
C-7, 11, 12.0-36.5 (TL)
C-8, 5, 10.5-34.0
D-1, ca.700, 84-122
D-3, 4, 23-39
D-4, 4, 21.5-60.0
D-5, 15, 14-23
D-7, 1, 46
E-1, 67, 18.5-71.0 (TL)
E-2, 7, 39-68 (TL)
E-3, 4, 55-66 (TL)
E-4, 12, 14-35
F-1, 132, 34-70
F-2, 60, 27-152
G-1, 6, 46-123
G-2, 84, 17-155
G-3, 602, 12-62
G-4, 46, 16-124
G-5, 151, 15-41 (TL)
G-6, 6, 14.5-39.0
H-1, 5, 15-29
H-2, 16, 13-25
H-3, 15, 22.5-34.0 (TL)
H-4, 70, 15-32 (TL)
H-5, 52, 11 (TL)-135
H-6, 3, 17 (TL)-131
H-7, 16, 15-41
J-1, 167, 84-156
J-3, 270, 14-105
J-4, 568, 14-99
J-5, 236, ca.15-40
K-1, 2, 22-25
K-3, 2, 33-57 (TL)

Poronotus triacanthus (Peck)(Cont.)

D-66-10 (Cont.)

K-4, 1, 15.5 (TL)
K-5, 2, 18.5-19.0
K-6, 13, 13.5-20.5 (TL)
K-7, 8, 17.0-52.5 (TL) & 2, NMD
L-1, 30, 68-161
L-2, 9, 21 (TL)-107
M-1, 1, 137
M-2, 3, 103-137

D-66-12

B-2, 1, 103
B-3, 1, 21 (TL)
B-6, 1, 17.5 (TL)
C-1, 3, 53-72
C-2, 6, 18 (TL)-78
C-4, 8, 15-57
C-5, 2, 35-93
C-7, 3, 29-74
C-8, 1, 37.5
D-2, 1, 126
D-3, 3, 60-66
D-4, 3, 55-68
D-5, 10, 18.5-67.5
D-6, 3, 45-151
D-8, 33, 27-73
E-3, 58, 88-159
E-4, 3, 51-125
E-5, 15, 19-70 (TL)
E-6, 6, 48-64
E-7, 19, 22-57
E-8, 1, 38.5
F-1, 1, 130
F-2, 19, 36-176
F-3, 57 lbs., 91-186
F-4, 58, 20-62
F-5, 1, 63
F-6, 25, 19-61
F-7, 2, 22.5-47.0
G-1, 189, 108-151
G-2, 92, 63-190
G-3, 222, 56-110
G-4, 4, 24-90
H-1, 27, 76-127
H-4, 1, 49.5
H-6, 2, 19-39
H-7, 1, 30
J-1, 8, 50-70
J-2, 45, 72-105
J-3, 8, 73-113
J-5, 2, 25.5-41.5
J-6, 8, 36-47
J-7, 2, 29.5-33.5

Poronotus triacanthus (Peck)(Cont.)
D-66-12 (Cont.)
K-3, 33, 22-95
K-4, 12, 26-48
K-5, 127, 25-55
K-6, 4, 23-37
K-7, 2, 19.5-23.0
L-1, 13, 20-108
L-2, 2, 29-55
L-3, 1, 21.5 (TL)
D-66-14
A-1, 1, 80
A-3, 7, 86-109
B-1, 2, 89-92
B-3, 2, 83-100
B-4, 2, 111-121
C-2, 2, 94-95
C-3, 1, 24.5 (TL)
C-4, 4, 37-117
C-5, 2, 96-98
D-1, 7, 50-187
D-2, 8, 58-204
D-3, 13, 73-192
D-4, 4, 73-96
E-1, 2, 143-163
E-2, 10, 107-163
E-3, 9, 114-167
E-4, 3, 18 (TL)-112
E-5, 23, 24 (TL)-61
E-6, 3, 22-38
E-7, 74, 25.5-54.0
F-1, 95, 80-143
F-6, 7, 20-88
F-7, 7, 24-41
G-1, 8, 101-169
G-2, 7, 100-169
G-5, 1, 43
G-6, 1, 25.5 (TL)
J-1, 79, 74-149
J-2, 80, 66-122
J-4, 3, 108-140
J-5, 16, 32-95
J-6, 11, 21-68
J-7, 10, 21-43
K-4, 9, 16 (TL)-75
K-6, 30, 22.0-58.5
K-7, 60, 23-51
L-4, 86, 20-79
L-5, 8, 21-38
M-4, 1, 29.5
M-5, 1, 28.5
P-1, 93, 80-163
P-2, 365, 52-136

Psenes maculatus Lütken
silver driftfish
D-66-12
E-8, 1, 106

P. regulus Poey
spotted driftfish
D-66-7
M-4, 2, 14.5-18.5 (TL)
D-66-12
N-2, 1, 26.5 (TL)
N-3, 1, 18.0
D-66-14
M-4, 4, 55-76
M-5, 1, 63

SPHYRAENIDAE
Sphyraena guachancho Cuvier
guaguanche
D-66-12
L-3, 1, 25 (TL)

ATHERINIDAE
Menidia menidia (Linneaus)
Atlantic silverside
D-66-14
D-1, 1, 66
E-1, 51, 47-87
J-4, 3, 80-89
P-1, 1, 85

BOTHIDAE
Ancylopsetta sp.
D-66-12
L-3, 4, 12.0-15.5 (TL)
L-4, 1, 13.0 (TL)
N-3, 1, 26 (TL)
D-66-14
L-1, 1, 15 (TL)
M-1, 2, (mut.)-24.0 (TL)
M-4, 1, 18 (TL)
M-5, 2, 15.5-19.0 (TL)

Bothus occellatus (Agassiz)
eyed flounder
D-66-7
M-4, 1, 19 (TL)
D-66-10
G-5, 1, 20 (TL)

Bothus occellatus (Agassiz)(Cont.)
D-66-12
B-3, 2, 23.0-24.5 (TL)
B-4, 2, 20.0-22.5 (TL)
B-6, 1, 21.5 (TL)
K-6, 1, 17 (TL)
L-3, 5, 13-23 (TL)
L-4, 12, 14-22 (TL)
M-3, 18, 16.0-24.5 (TL)
N-2, 9, 15.5-23.5 (TL)
N-3, 3, ca.22 (TL)
D-66-14
L-2, 1, (mut.)
M-1, 4, ca.12-18 (TL)
M-4, 2, 19.0-20.5 (TL)
M-5, 7, 19-24 (TL)

Bothus sp.
D-66-12
M-3, 1, 23 (TL)

Citharichthys sp.
D-66-10
G-5, 1, (mut.)
D-66-12
B-4, 8, 9.5-19.5 (TL)
B-5, 2, 16.5-19.0 (TL)
B-6, 1, 12.0 (TL)
C-4, 7, 11.5-17.0 (TL)
C-6, 2, (mut.-16.0 (TL)
C-7, 5, ca.15 (TL)
H-5, 1, 14 (TL)
D-66-14
M-3, 2, 14.0-17.5 (TL)

Etropus microstomus (Gill)
smallmouth flounder
D-66-3
MWT-2, 3, 45-87
D-66-5
J-2, 7, NMD
K-1, 1, 91 (TL)
L-2, 1, 102 (TL)
L-3, 4, 99-134

Etropus microstomus (Gill)(Cont.)
D-66-10
F-2, 44, 83-123
G-2, 1, 82 (TL)
K-1, 1, 76
K-3, ca.250, ca.20-90
L-1, 13, 41-83
D-66-12
F-4, 1, 94
J-3, 1, 97
M-3, 1, 81

Etropus sp.
D-66-10
L-2, 1, 32.5 (TL)
D-66-12
L-3, 5, 8.0-15.0 (TL)

Paralichthys dentatus (Linnaeus)
summer flounder
D-66-3
MWT-2, 1, 554 (TL)
D-66-10
F-1, 2, 306-366
G-2, 1, 385 (TL)
K-3, 4, 290-449 (TL)
L-1, 1, 264 (TL)
D-66-12
H-2, 1, 313

Paralichthys oblongus (Mitchill)
fourspot flounder
D-66-5
H-5, 1, 297 (TL)
J-4, 1, 276 (TL)
K-5, 1, 230 (TL)
L-3, 2, 217-222
D-66-7
K-4, 1, 189 (TL)
D-66-10
F-1, 1, 110
K-3, 4, 235-304 (TL)
K-3, ca.100, 22-104
L-1, 1, 145

Paralichthys oblongus (Mitchill)(Cont.)
D-66-12
D-3, 1, 166 (TL)
E-5, 2, 250-295 (TL)
J-3, 1, 71
J-6, 4, 210-322
J-6, 1, 28.5 (TL)
K-3, 1, 120 (TL)
D-66-14
E-3, 1, 120

Scophthalmus aquosus (Mitchill)
windowpane
D-66-3
MWT-2, 6, 71-293
D-66-5
H-2, 1, 257 (TL)
J-3, 2, NMD
J-4, 1, 276 (TL)
L-1, 1, 132 (TL)
L-3, 1, 236
D-66-7
B-1, 5, 160-286 (TL)
D-66-10
F-1, 7, 120-154
F-2, 1, 115
G-2, 1, 181 (TL)
L-1, 1, 186
D-66-12
D-3, 12, 227-300
E-4, 1, 248
E-5, 1, 248 (TL)
G-3, 1, 275
J-2, 1, 205
D-66-14
D-1, 2, 16.5-19.0 (TL)
D-2, 5, 12.5-40.5 (TL)
D-3, 1, (mut.)
F-2, 1, 268

Unidentified
D-66-12
H-6, 1, (mut.)

PLEURONECTIDAE
Glyptocephalus cynoglossus (Linnaeus)
witch flounder
D-66-7
D-8, 1, 33 (TL)
K-5, 5, 43.5-52.5 (TL)
L-5, 1, 44.5 (TL)

Glyptocephalus cynoglossus (Linnaeus) (Cont.)
D-66-10
D-7, 25, 29.0-59.5 (TL)
D-8, 77, 23.0-50.5 (TL)
G-5, 6, 25-44 (TL)
G-6, 4, 35-42 (TL)
H-5, 7, (mut.)-38 (TL)
H-6, 1, 51 (TL)
J-5, 1, ca.25 (TL)
J-6, 54, 24.5-52.0 (TL)
K-5, 4, (mut.)-37.9 (TL)
K-6, 13, 27.5-49.5 (TL)
D-66-12
B-5, 7, 29-41 (TL)
B-6, 4, 43.0-53.5 (TL)
C-2, 1, 44.5 (TL)
C-6, 1, 46.5 (TL)
C-7, 1, ca.15 (TL)
F-6, 1, 47.0 (TL)
H-4, 1, (mut.)
H-5, 1, (mut.)
H-6, 10, 29.0-44.5 (TL)
J-6, 1, 38.0 (TL)

Limanda ferruginea (Storer)
yellowtail flounder
D-66-7
C-2, 20, 13.5-18.5 (TL)
C-3, 68, 13.0-19.5 (TL)
C-4, 10, 14.0-19.5 (TL)
C-5, 15, 15.5-22.5 (TL)
C-6, 38, 12.5-22.5 (TL)
D-6, 80, 13.5-21.5 (TL)
D-8, 2, ca.14 (TL)
K-5, 1, 17.5 (TL)
D-66-10
B-7, 1, 22 (TL)

Pseudopleuronectes americanus (Walbaum)
winter flounder
D-66-5
H-5, 1, 233 (TL)
J-2, 17, 160-239
J-3, 2, NMD
J-4, 1, 173 (TL)
D-66-7
B-1, 1, 299 (TL)
D-66-10
C-2, 12, 172-261 (TL)
D-66-12
D-3, 7, 246-300 (TL)

SOLEIDAE
Trinectes maculatus (Bloch & Schneider)
hogchoker
D-66-10
F-1, 1, 169

CYNOGLOSSIDAE
Symphurus plagiusa (Linnaeus)
blackcheek tonguefish
D-66-10
L-1, 6, 96-181 (TL)

MONACANTHIDAE
Alutera schoepfi (Walbaum)
orange filefish
D-66-5
M-1, 17, 411-428
D-66-7
N-2, 1, 77 (TL)
D-66-10
J-1, 1, ca.350

Amanses pullus (Ranzani)
orangespotted filefish
D-66-7
P-4, 1, 81

Monacanthus ciliatus (Mitchill)
fringed filefish
D-66-5
M-4, 1, 22 (TL)
D-66-7
N-3, 1, 17.5 (TL)
P-2, 2, 17.0-19.0 (TL)

Stephanolepis hispidus (Linnaeus)
planehead filefish
D-65-4
N-5, 3, 145-166
D-66-5
N-1, 1, 136 & 4, NMD
D-66-7
P-2, 1, 70 (TL)
P-3, 1, 26 (TL)
D-66-10
B-6, 1, 53 (TL)
K-4, 1, 17.0 (TL)
K-5, 2, 27.0-27.5 (TL)
L-1, 3, 76-87
L-2, 1, 19 (TL)

Stephanolepis hispidus (Linnaeus) (Cont.)
D-66-12
D-5, 1, 123
D-6, 2, 86-129
L-3, 1, 13 (TL)
M-3, 1, 16 (TL)
N-2, 1, 15.5 (TL)
D-66-14
P-2, 1, 29.5 (TL)

TETRAODONTIDAE
Sphaeroides maculatus (Bloch & Schneider)
northern puffer
D-66-5
F-1, 1, NMD
H-1, 4, 110-160 (TL)
K-1, 2, 93-96 (TL)
M-1, 2, NMD
N-3, 1, NMD
D-66-10
A-5, 1, 30 (TL)
F-1, 51, 69-88 (TL)
K-1, 3, 76-88
L-1, 25, 29-87 (TL)
D-66-12
B-3, 1, 37 (TL)
F-4, 1, 102 (TL)
G-3, 8 lbs., 85-97 (TL)
J-2, 81, 83-125
J-4, 1, ca.15 (TL)
L-1, 1, 154 (TL)
D-66-14
E-2, 1, 207
F-3, 1, 73
G-2, 1, 58
J-1, 82, 81-236
M-1, 10, ca.50-85

S. testudineus (Linnaeus)
checkered puffer
D-66-14
M-5, 1, 19 (TL)

LOPHIIDAE
Lophius americanus Valenciennes
goosefish
D-66-5
C-6, 1, NMD
H-1, 1, 1030 (TL)

Lophius americanus Valenciennes(Cont.)

D-66-7

C-2, 13, ca.4.0 (TL)
D-6, 1, 59.5 (TL)
H-5, 3, 33.0-38.5 (TL)
K-4, 5, 30.5-45.0 (TL)
K-5, 3, 26.0-39.0 (TL)

D-66-10

B-6, 1, ca.24 (TL)
C-3, 1, 85 (TL)
D-4, 1, 70 (TL)
D-7, 6, 75-102 (TL)
D-8, 4, 19-22 (TL)
G-3, 1, 27 (TL)
G-6, 1, 39 (TL)
H-4, 4, 18-38
H-5, 2, 12.5-21.0 (TL)
J-6, 1, 24 (TL)
K-3, 2, 136-140 (TL)
K-4, 1, 35.5 (TL)
K-5, 5, 22.5-25.5 (TL)
K-6, 3, 19.5-21.0 (TL)

D-66-12

B-3, 1, 28 (TL)
B-4, 3, 21.5-47.0 (TL)
B-5, 17, 16-56 (TL)
B-6, 16, 17-44 (TL)
C-2, 4, 32-47 (TL)
C-4, 1, 28.5 (TL)
C-5, 1, 21.5 (TL)
C-6, 1, 20.5 (TL)
C-7, 5, 19.5-74.0 (TL)
C-8, 1, 32.5 (TL)
D-6, 1, 35.5 (TL)
E-5, 1, 303 (TL)
E-7, 1, 46.5 (TL)

D-66-14

C-3, 1, 845 (TL)
E-5, 2, 45-66
E-6, 4, 78-103
E-7, 4, 73-98
L-3, 1, 50 (TL)
L-4, 1, 78 (TL)

OGCOCEPHALIDAE

Ogcocephalus sp.

batfish

D-66-10

K-4, 1, 17.5 (TL)

Unidentified

D-66-10

D-5, 1, (mut.)

Figures A1 - A8:--R. V. <u>Dolphin</u> survey, 1965-66.

Surface temperatures

Lines of equal temperature are drawn at 1.0°C. intervals.

CORRECTION for

STUDIES OF ESTUARINE DEPENDENCE
OF ATLANTIC COASTAL FISHES

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U. S. Department of the Interior
August 1969

Legends for a number of the appendix charts and graphs were omitted in this paper. On the reverse of this sheet is an amended page 62. Please insert this correction sheet in your copy.

APPENDIX

Figures A1 - A8:--R. V. Dolphin survey, 1965-66: Surface temperatures. Lines of equal temperature are drawn at 1.0° C. intervals.

Figures B1 - B8:--R. V. Dolphin survey, 1965-66: Bottom temperatures. Lines of equal temperature are drawn at 1.0° C. intervals.

Figures C1 - C25:--R. V. Dolphin survey, 1965-66: Vertical temperature profiles for Cruises D-65-4 through D-66-14. For each survey transect, points of equal temperature are connected at 1.0° C. intervals; except for periods of low gradient when they are plotted at 0.5° C. intervals with a solid line for the whole degree values, and a dashed line for the half-degree values.

Figures D1 - D8:--R. V. Dolphin survey, 1965-66: Surface salinities. Data are plotted in parts per thousand (o/oo) salinity. Lines of equal salinity are drawn at intervals of 0.5 o/oo; solid lines for values in whole parts per thousand, dashed lines for values in half parts per thousand.

Figures E1 - E25:--R. V. Dolphin survey, 1965-66: Vertical salinity profiles. Data are plotted in parts per thousand (o/oo) of salinity. For each survey transect, points of equal salinity are connected at 0.5 o/oo intervals to the maximum sampling depth of 40 meters; solid lines for values in whole parts per thousand and dashed lines for values in half parts per thousand.

Figures F1 - F8:--R. V. Dolphin survey, 1965-66: Zooplankton volumes. Plankton densities are shown at four volume intervals, in milliliters displacement volume per Gulf V tow (excluding ichthyoplankton and seston items > 3 milliliters) for both shallow (0.15 m.) and deep (18-33 m.) tows. When materials in the sample prevented measurement by blocking filtration, the predominate material is plotted at the station as follows: D, dinoflagellates; T, thaliaceans; and S, sediments.

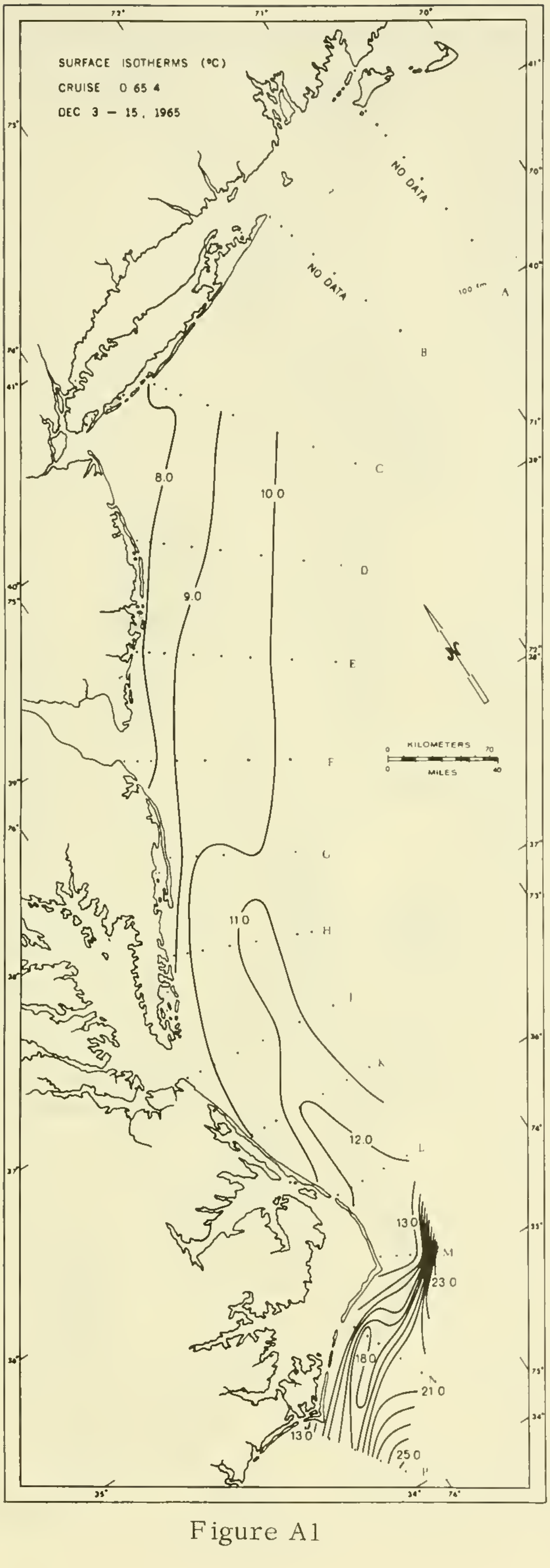


Figure A1

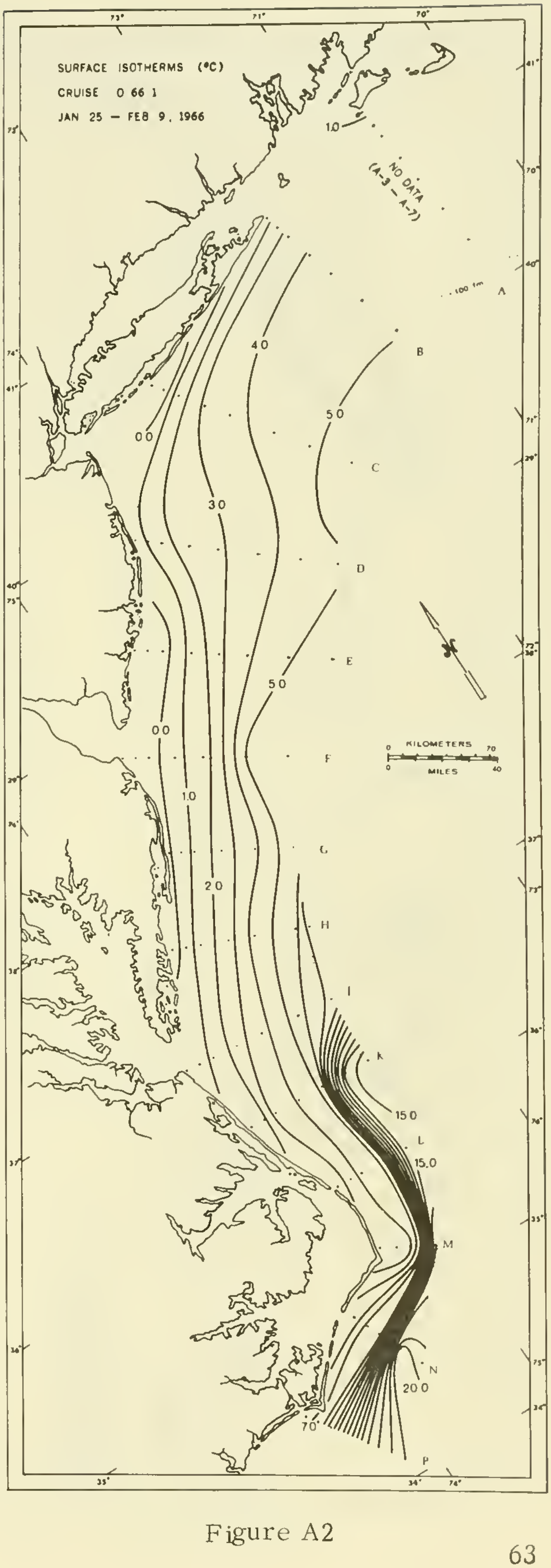


Figure A2

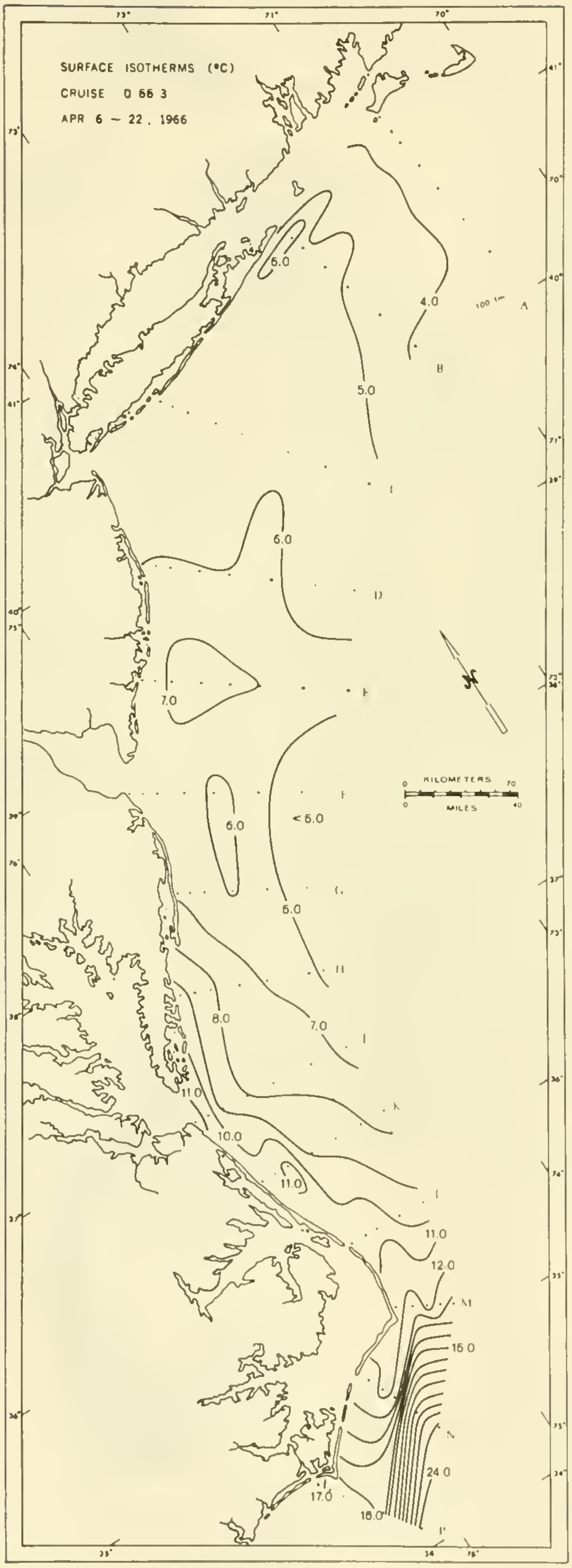


Figure A3

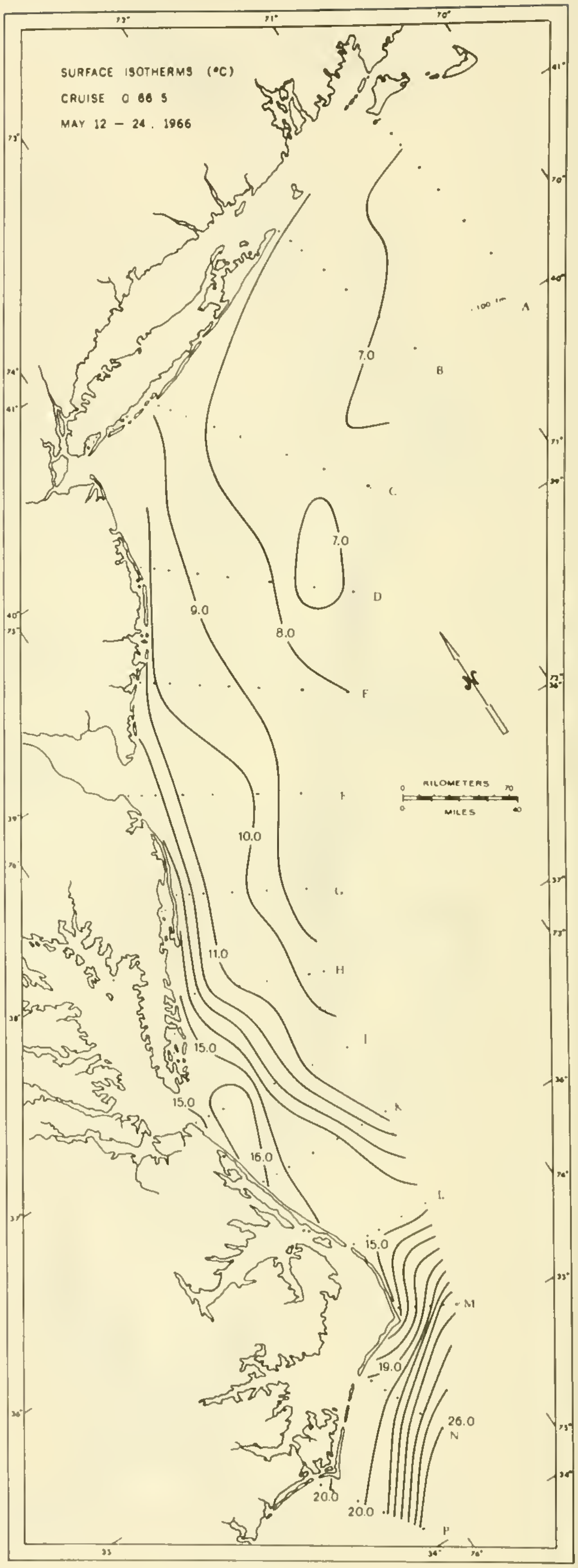


Figure A4

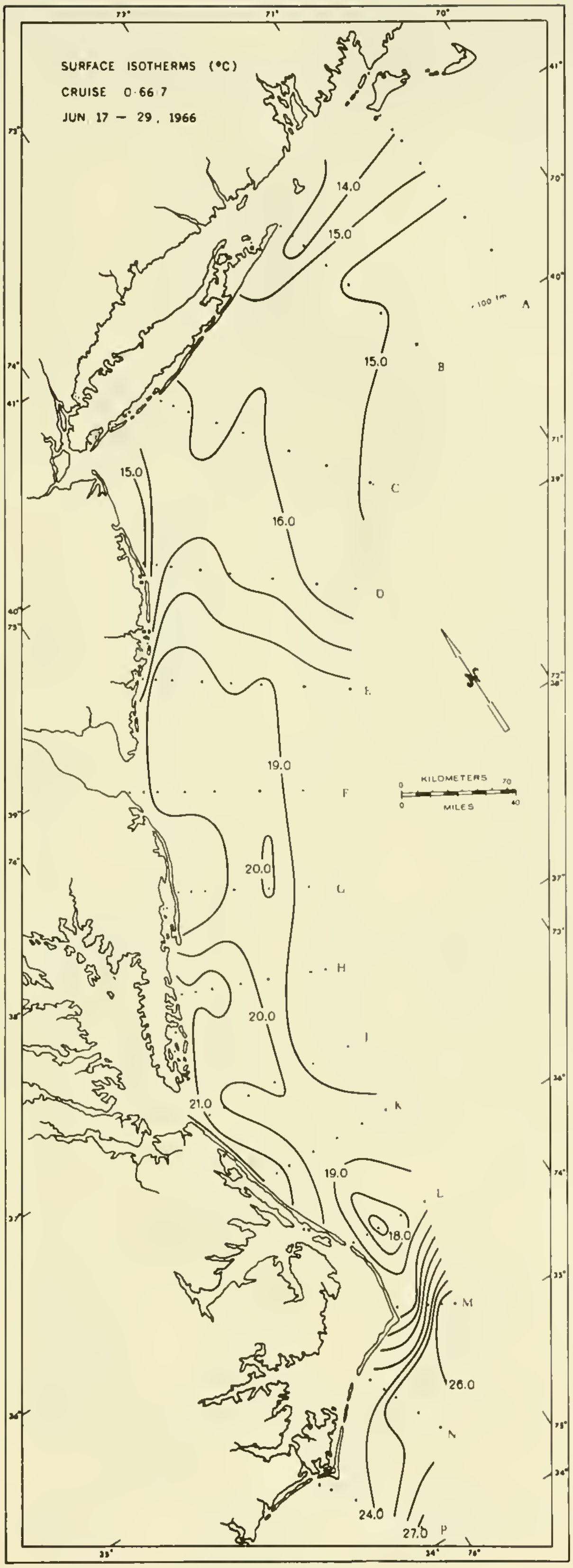


Figure A5

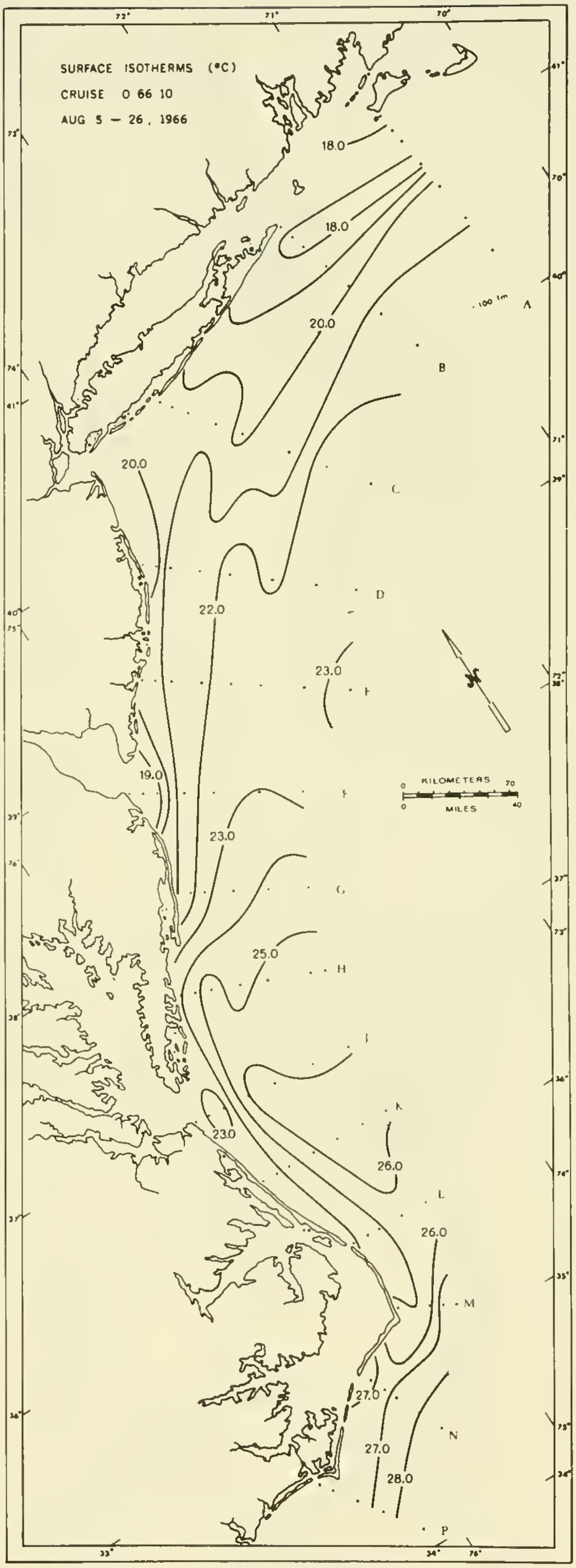


Figure A6

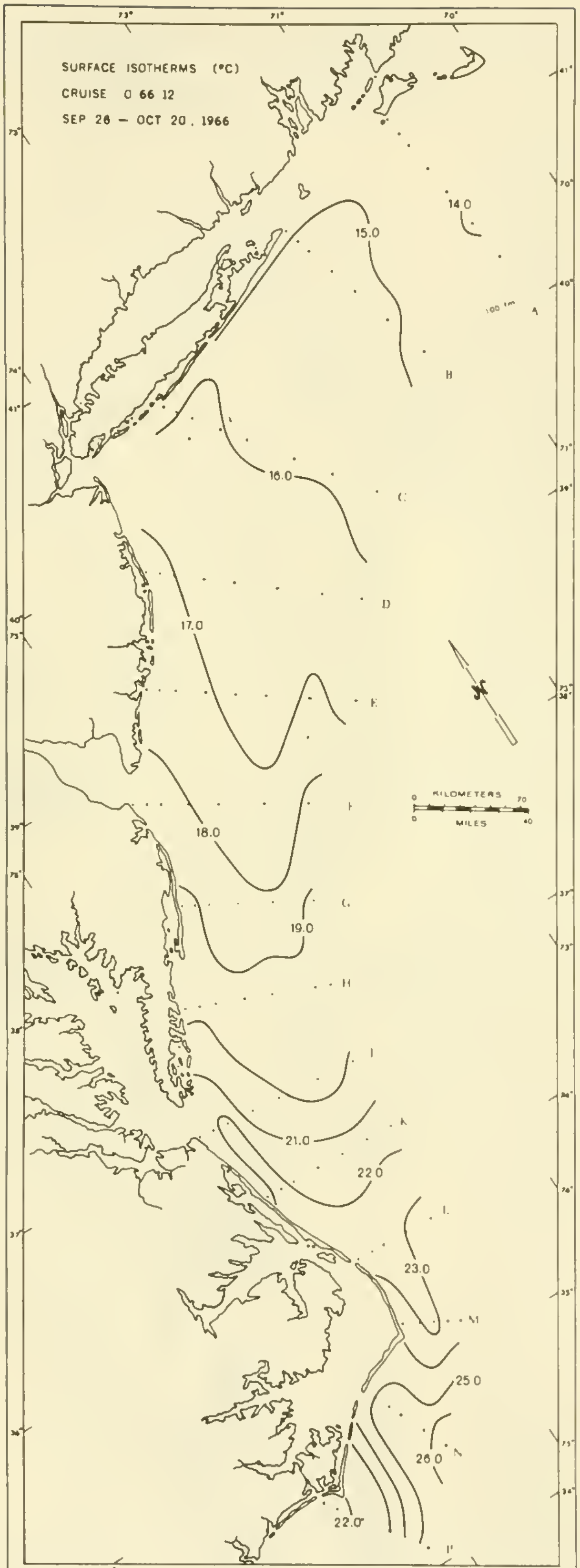


Figure A7

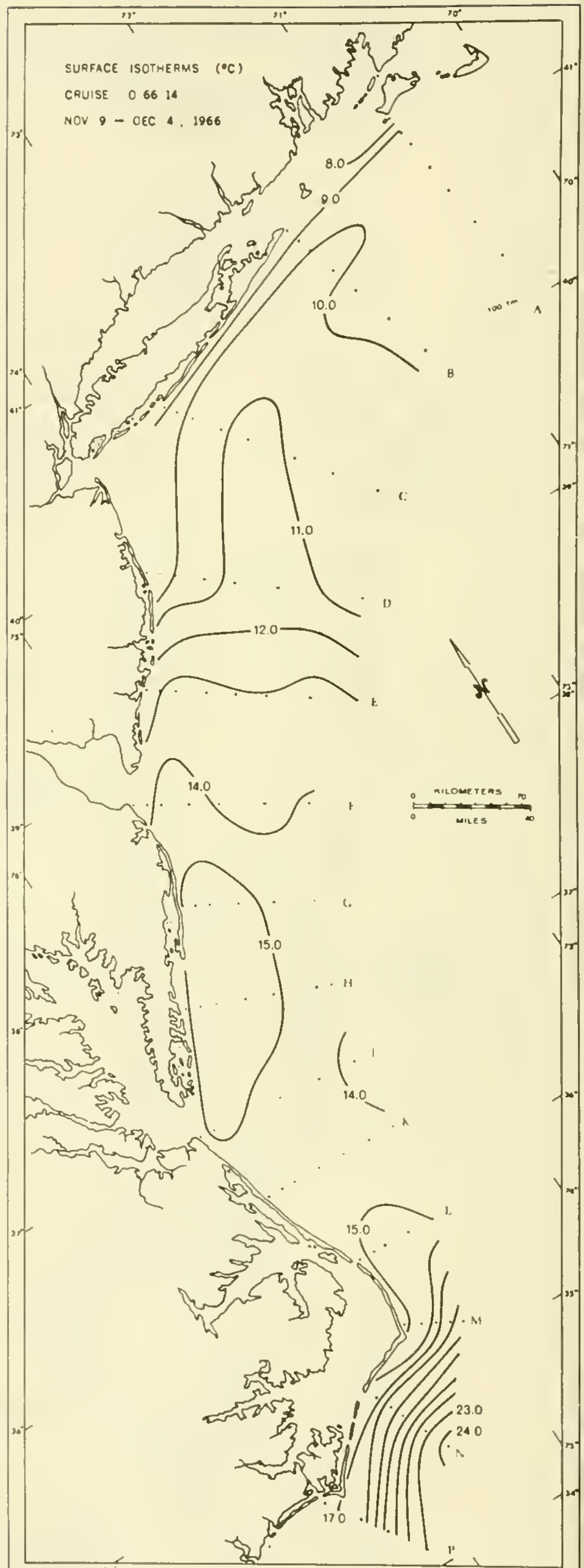


Figure A8

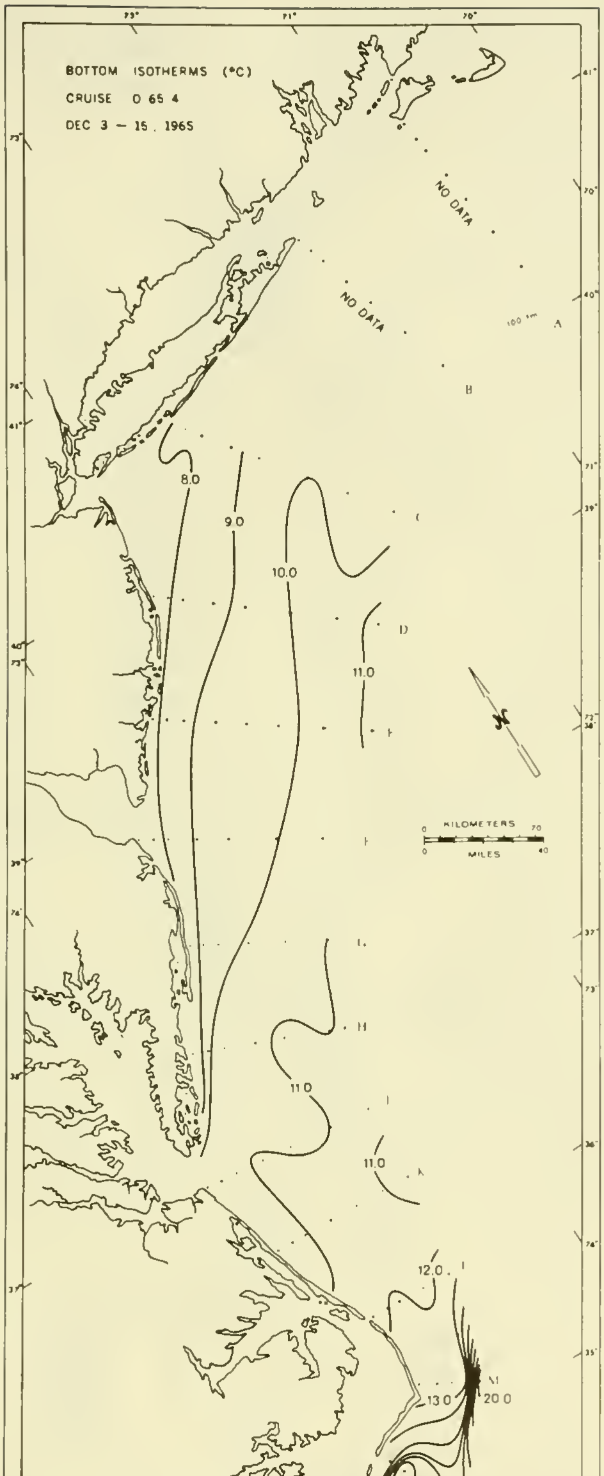


Figure B1

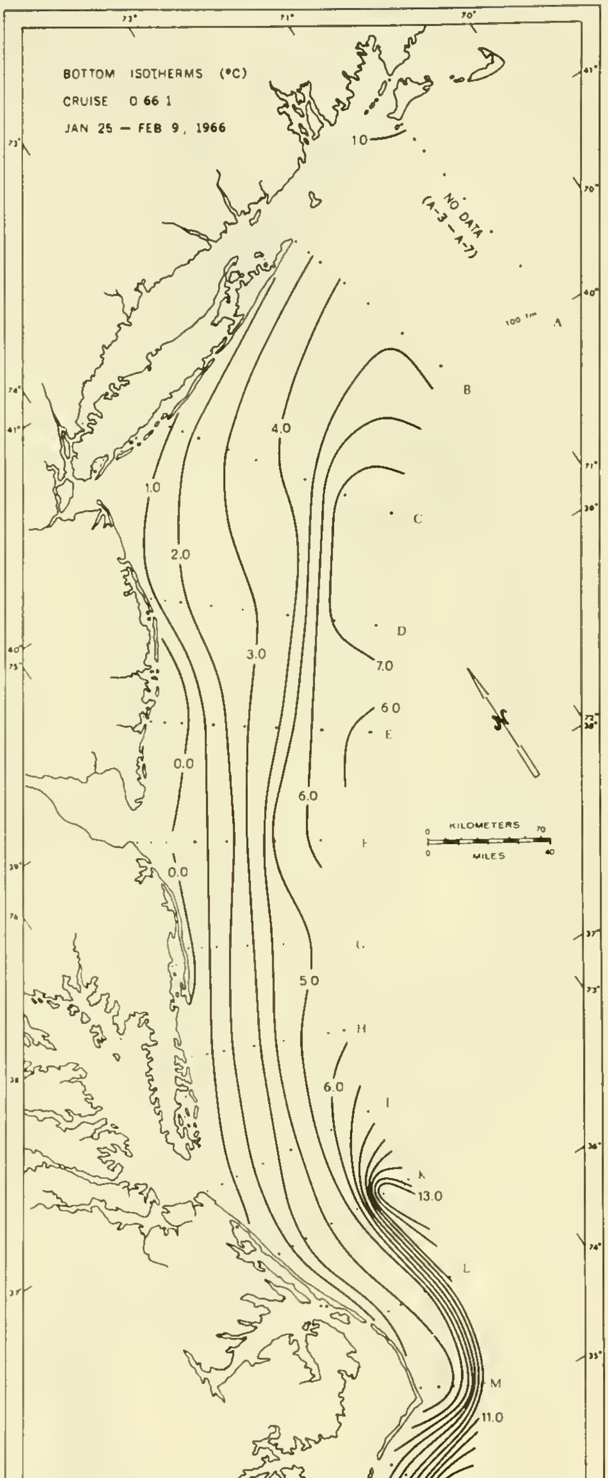


Figure B2

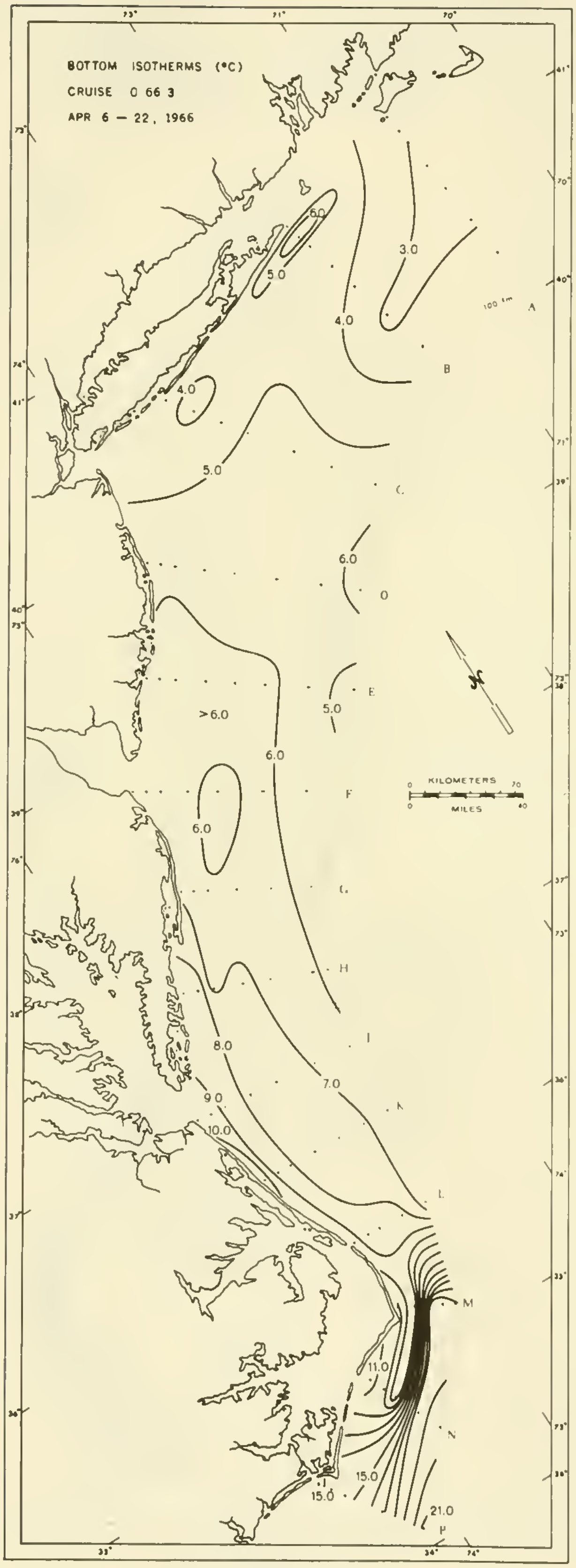


Figure B3

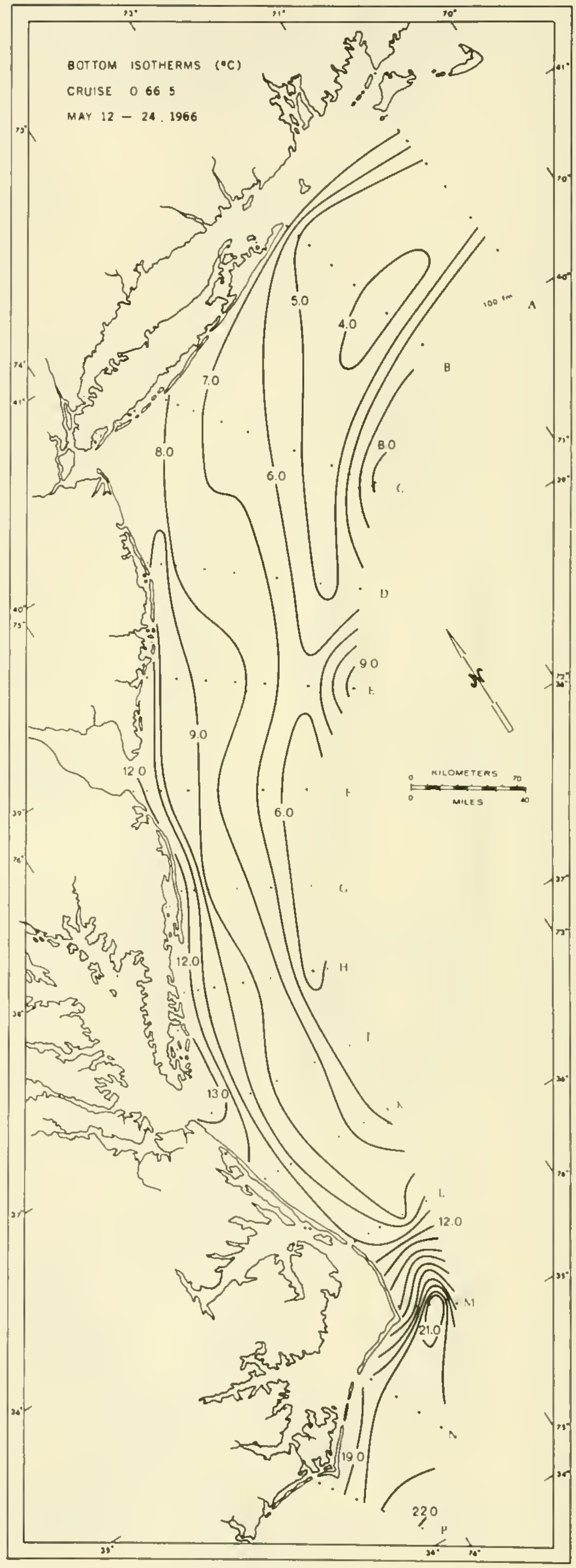


Figure B4

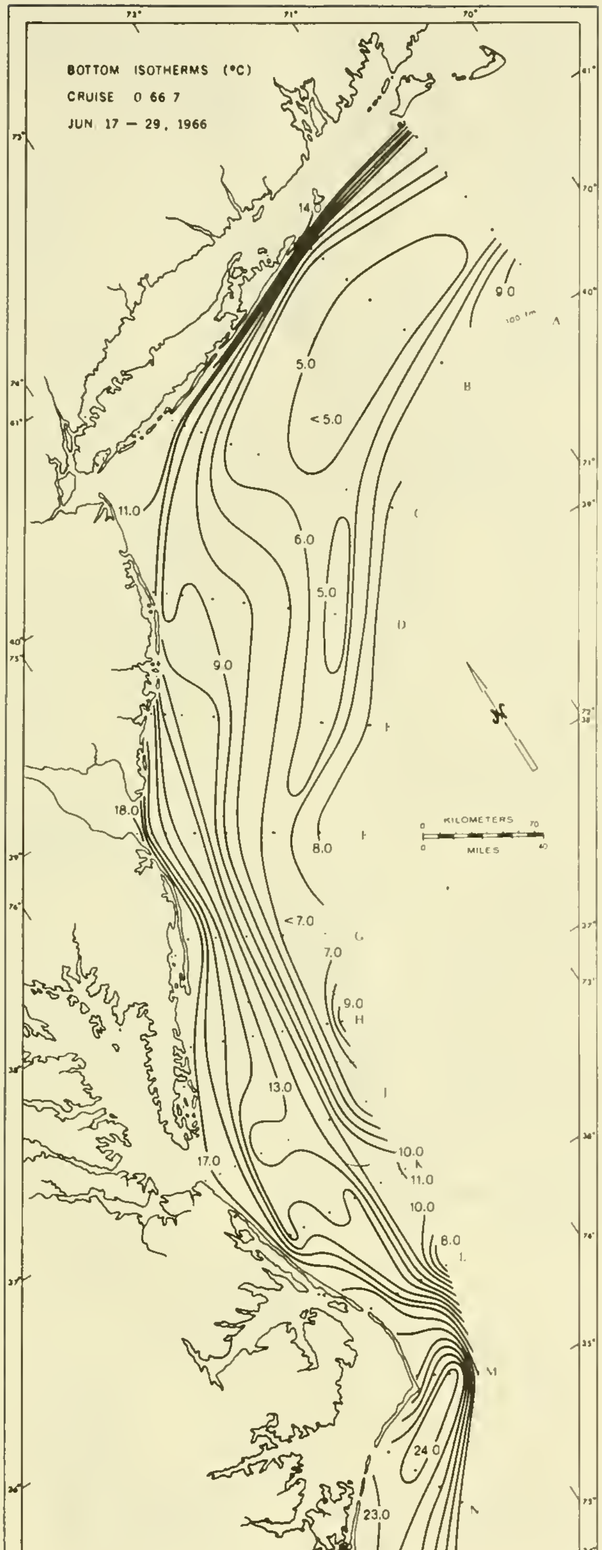


Figure B5

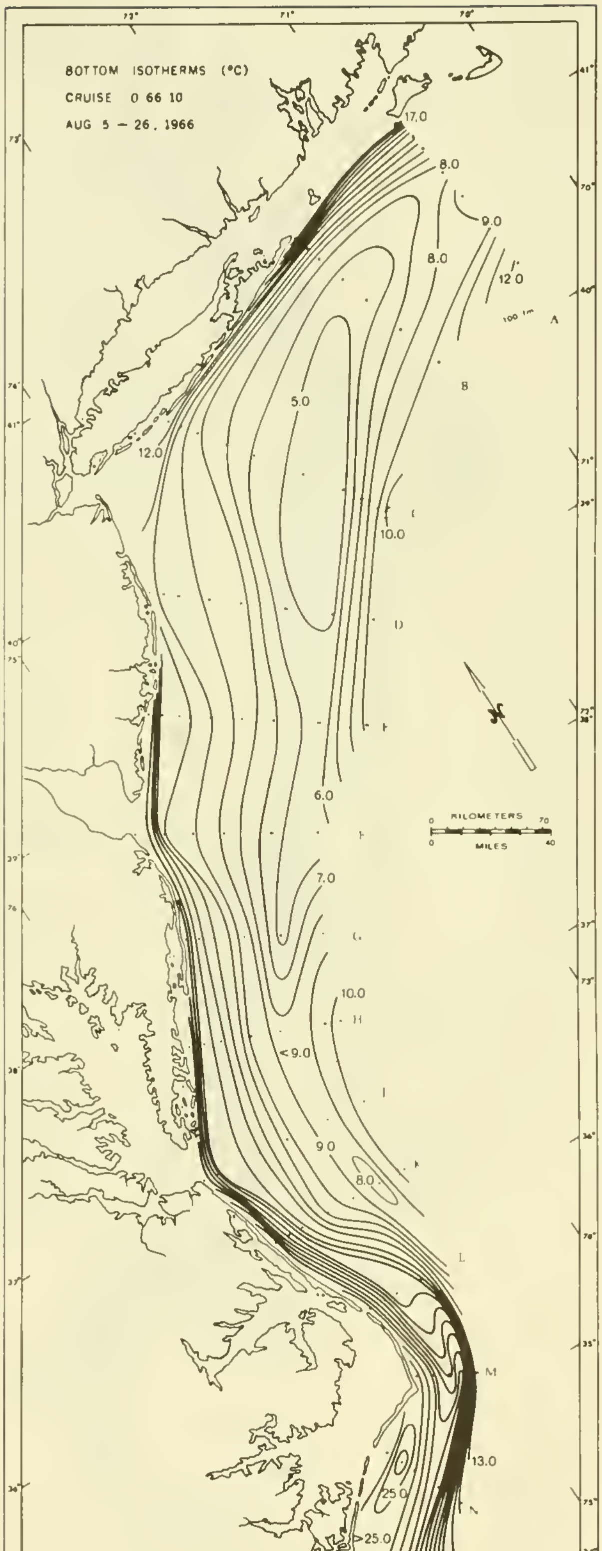


Figure B6

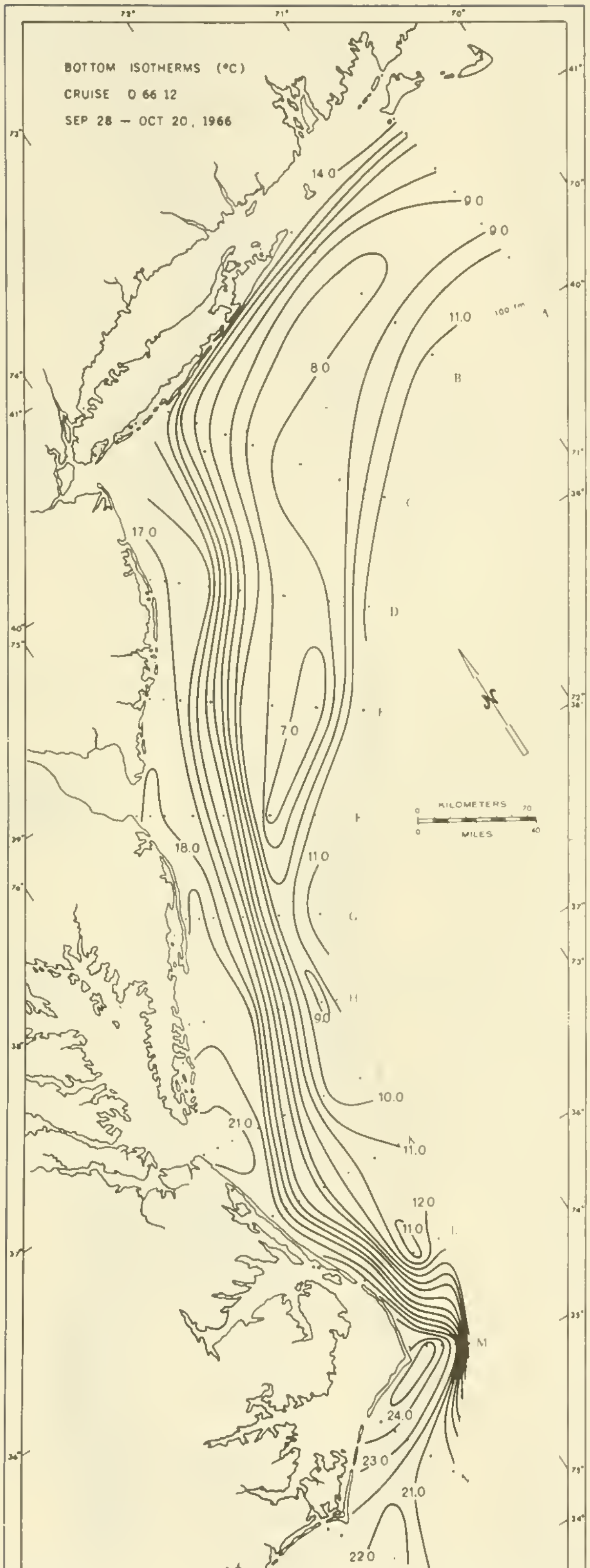


Figure B7

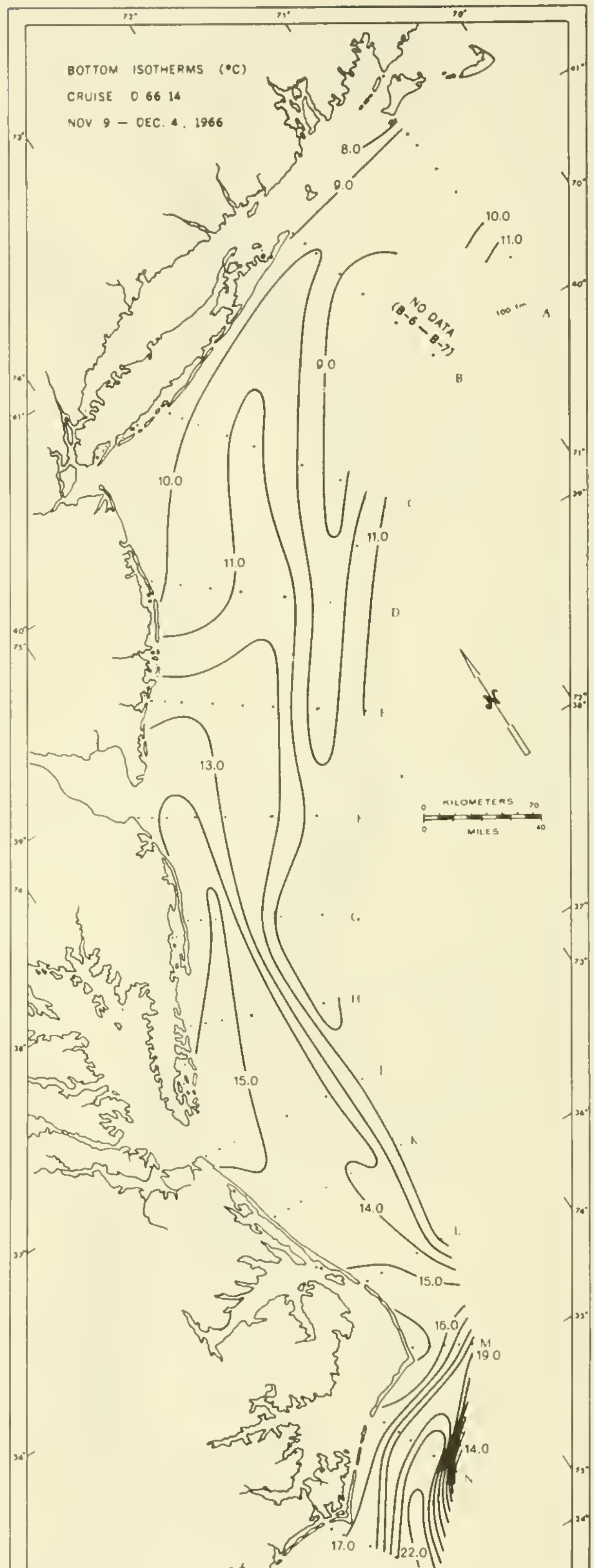


Figure B8

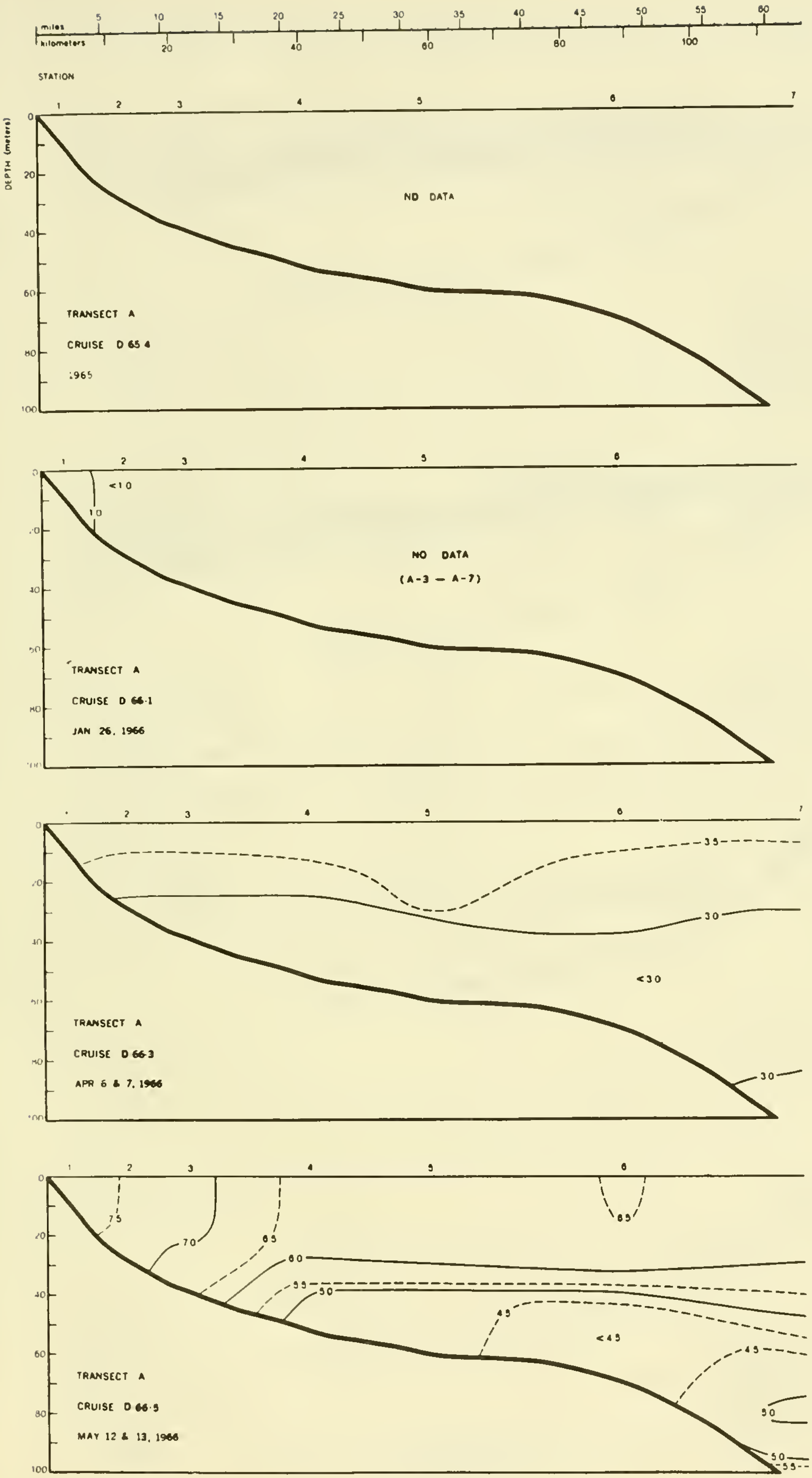
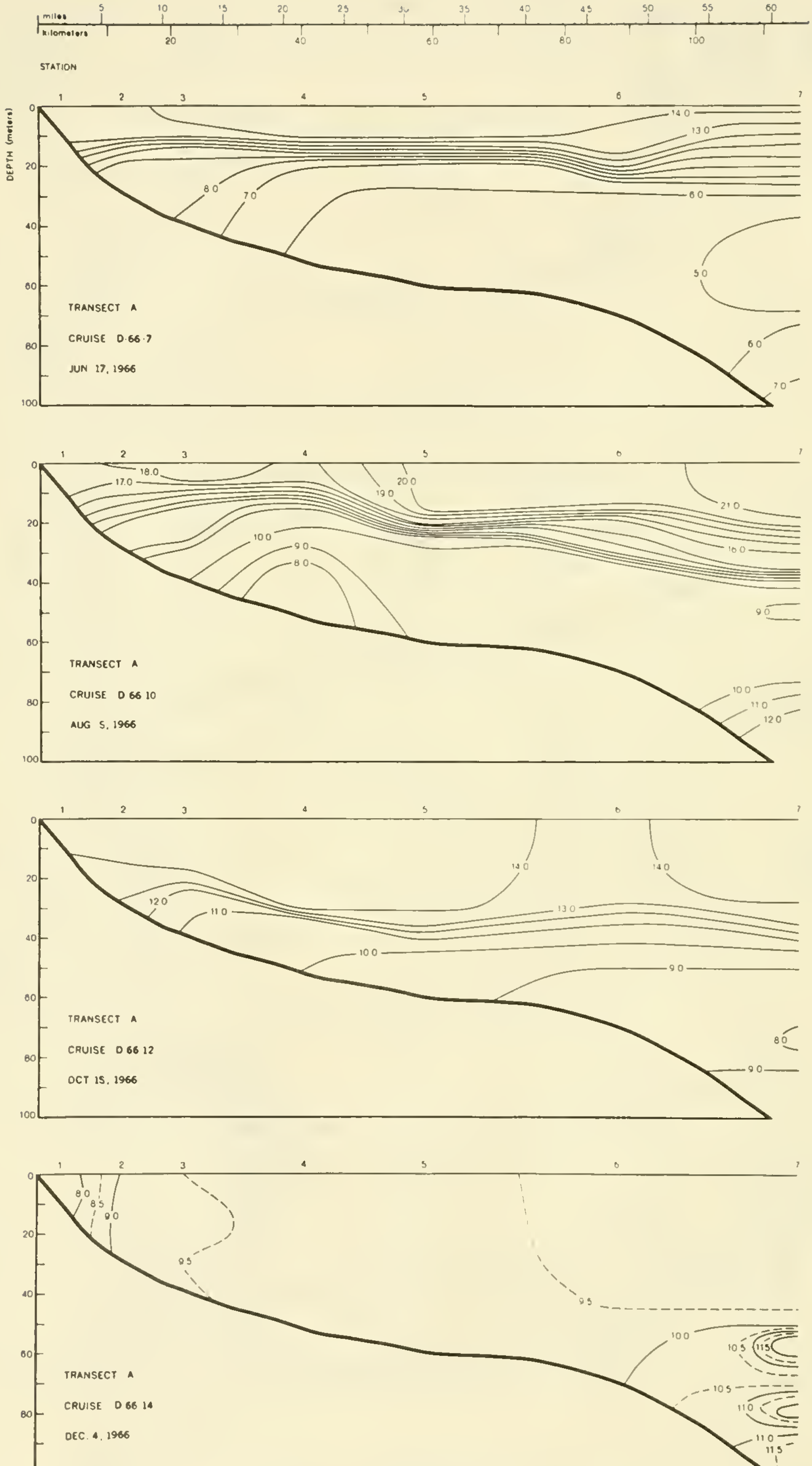
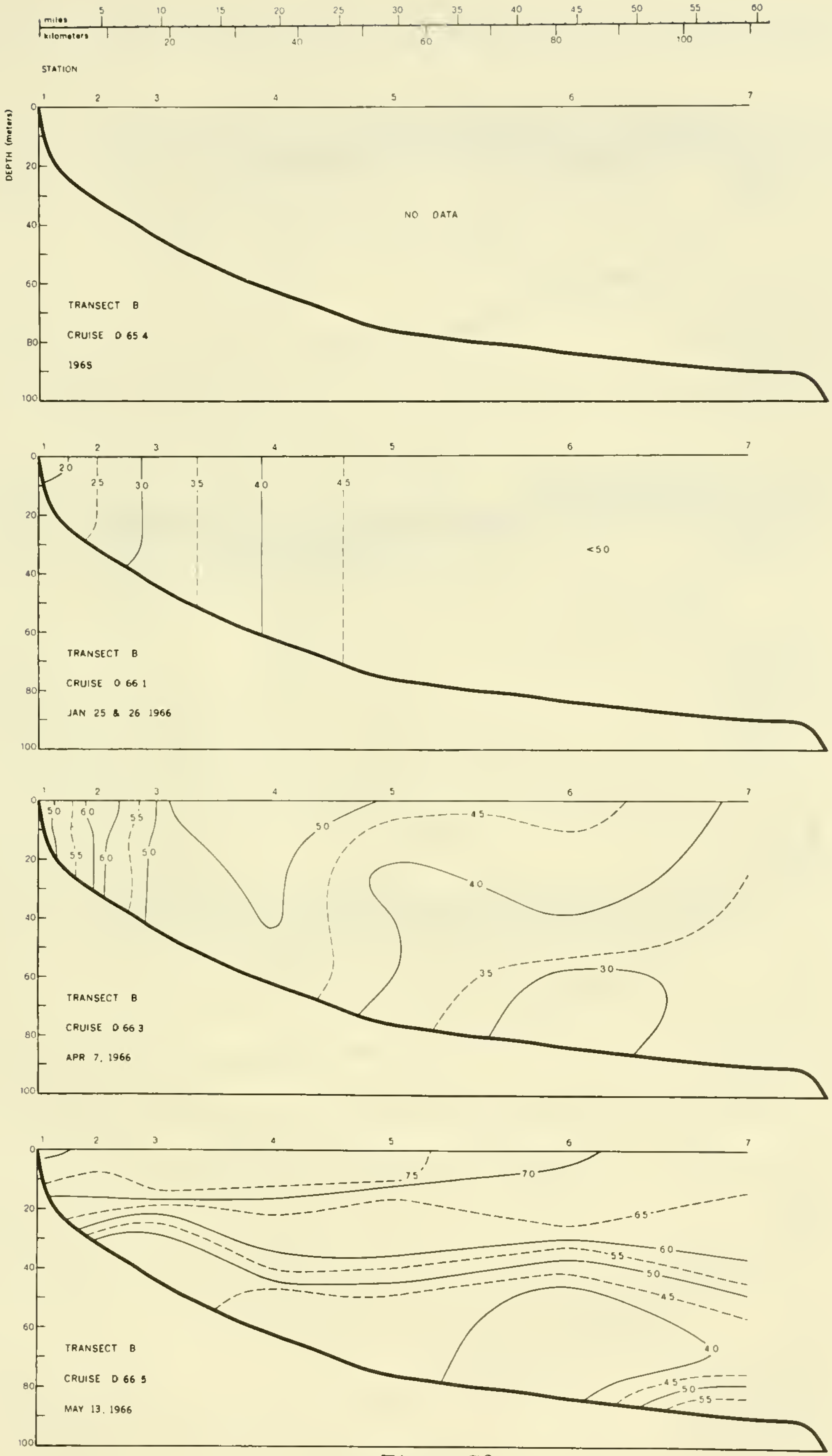

miles
kilometers
STATION
DEPTH (meters)
NO DATA
TRANSECT A
CRUISE D 65 4
1965
NO DATA
(A-3 — A-7)
TRANSECT A
CRUISE D 66-1
JAN 26, 1966
TRANSECT A
CRUISE D 66-3
APR 6 & 7, 1966
TRANSECT A
CRUISE D 66-5
MAY 12 & 13, 1966

Figure C1



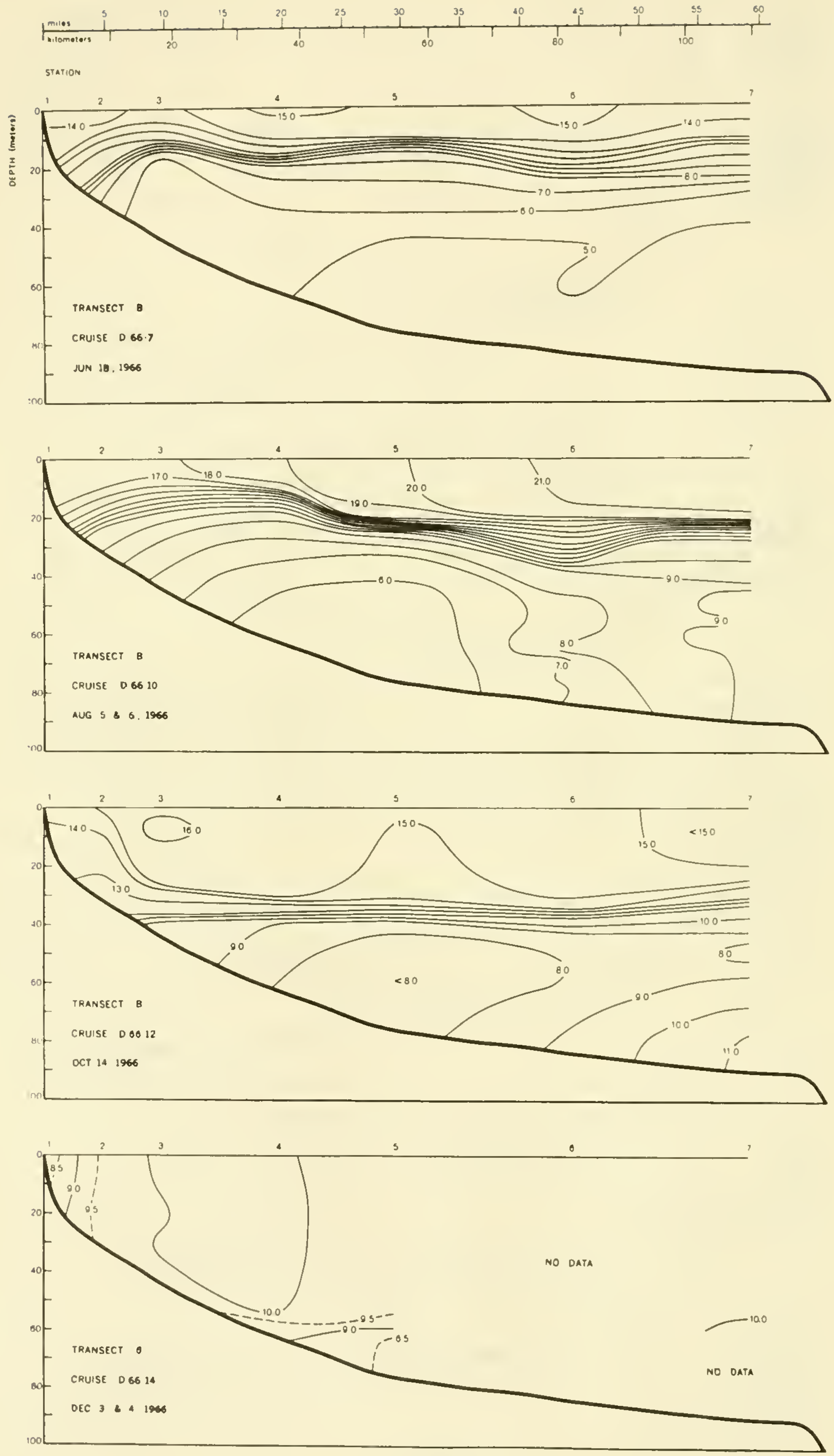
miles
kilometers
STATION
DEPTH (meters)
TRANSECT A
CRUISE D-66-7
JUN 17, 1966
TRANSECT A
CRUISE D 66 10
AUG 5, 1966
TRANSECT A
CRUISE D 66 12
OCT 15, 1966
TRANSECT A
CRUISE D 66 14
DEC. 4, 1966

Figure C2



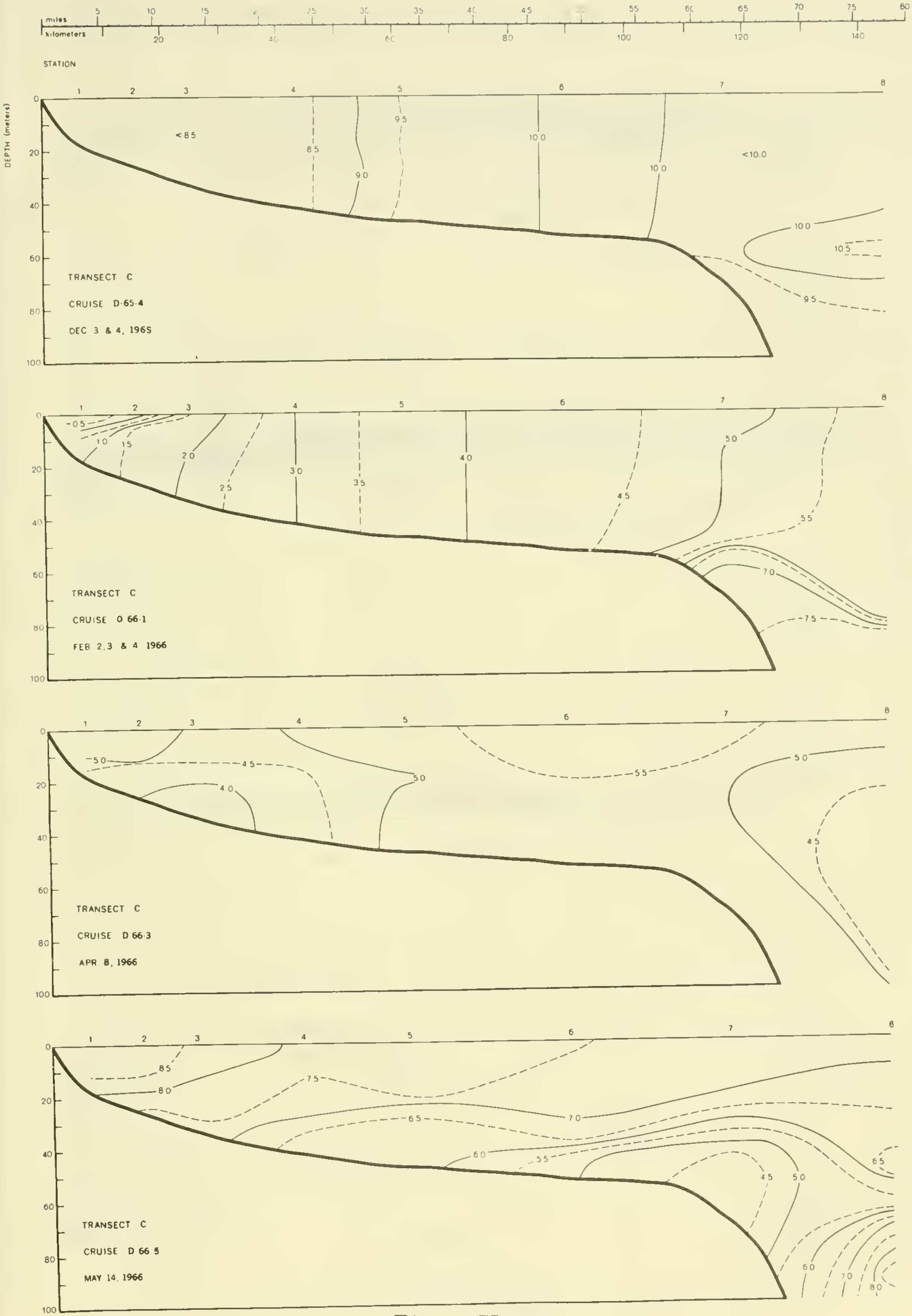
miles
kilometers
STATION
DEPTH (meters)
NO DATA
TRANSECT B
CRUISE D 65 4
1965
TRANSECT B
CRUISE D 66 1
JAN 25 & 26 1966
TRANSECT B
CRUISE D 66 3
APR 7, 1966
TRANSECT B
CRUISE D 66 5
MAY 13, 1966

Figure C3



miles
kilometers
STATION
DEPTH (meters)
TRANSECT B
CRUISE D 66-7
JUN 18, 1966
TRANSECT B
CRUISE D 66 10
AUG 5 & 6, 1966
TRANSECT B
CRUISE D 66 12
OCT 14 1966
TRANSECT B
CRUISE D 66 14
DEC 3 & 4 1966
NO DATA
NO DATA

Figure C4



miles
kilometers
STATION
DEPTH (meters)
TRANSECT C
CRUISE D-65-4
DEC 3 & 4, 1965
TRANSECT C
CRUISE D 66-1
FEB 2, 3 & 4 1966
TRANSECT C
CRUISE D 66-3
APR 8, 1966
TRANSECT C
CRUISE D 66 5
MAY 14, 1966

Figure C5

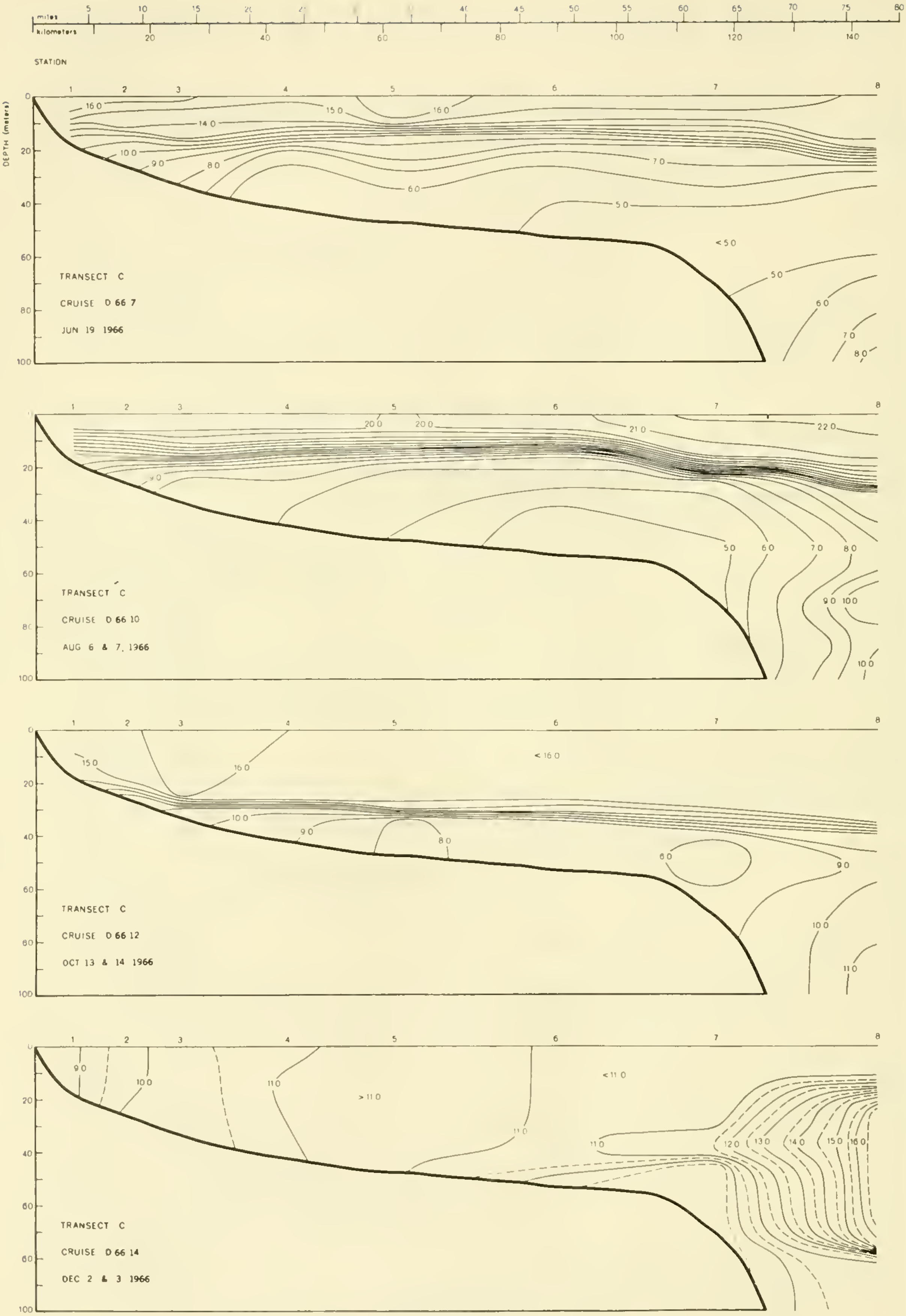

miles
kilometers
STATION
DEPTH (meters)
TRANSECT C
CRUISE 0 66 7
JUN 19 1966
TRANSECT C
CRUISE 0 66 10
AUG 6 & 7, 1966
TRANSECT C
CRUISE 0 66 12
OCT 13 & 14 1966
TRANSECT C
CRUISE 0 66 14
DEC 2 & 3 1966

Figure C6

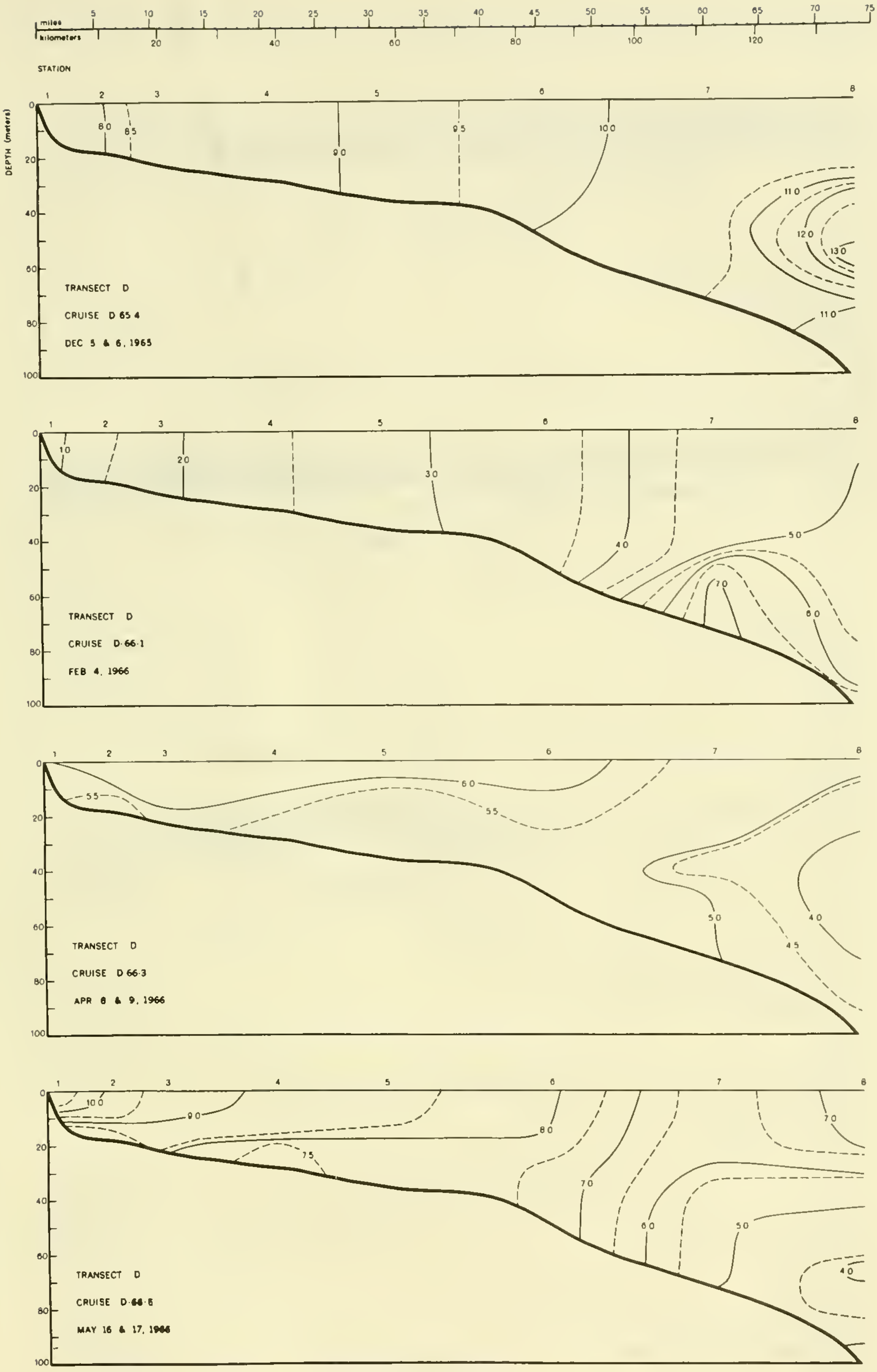
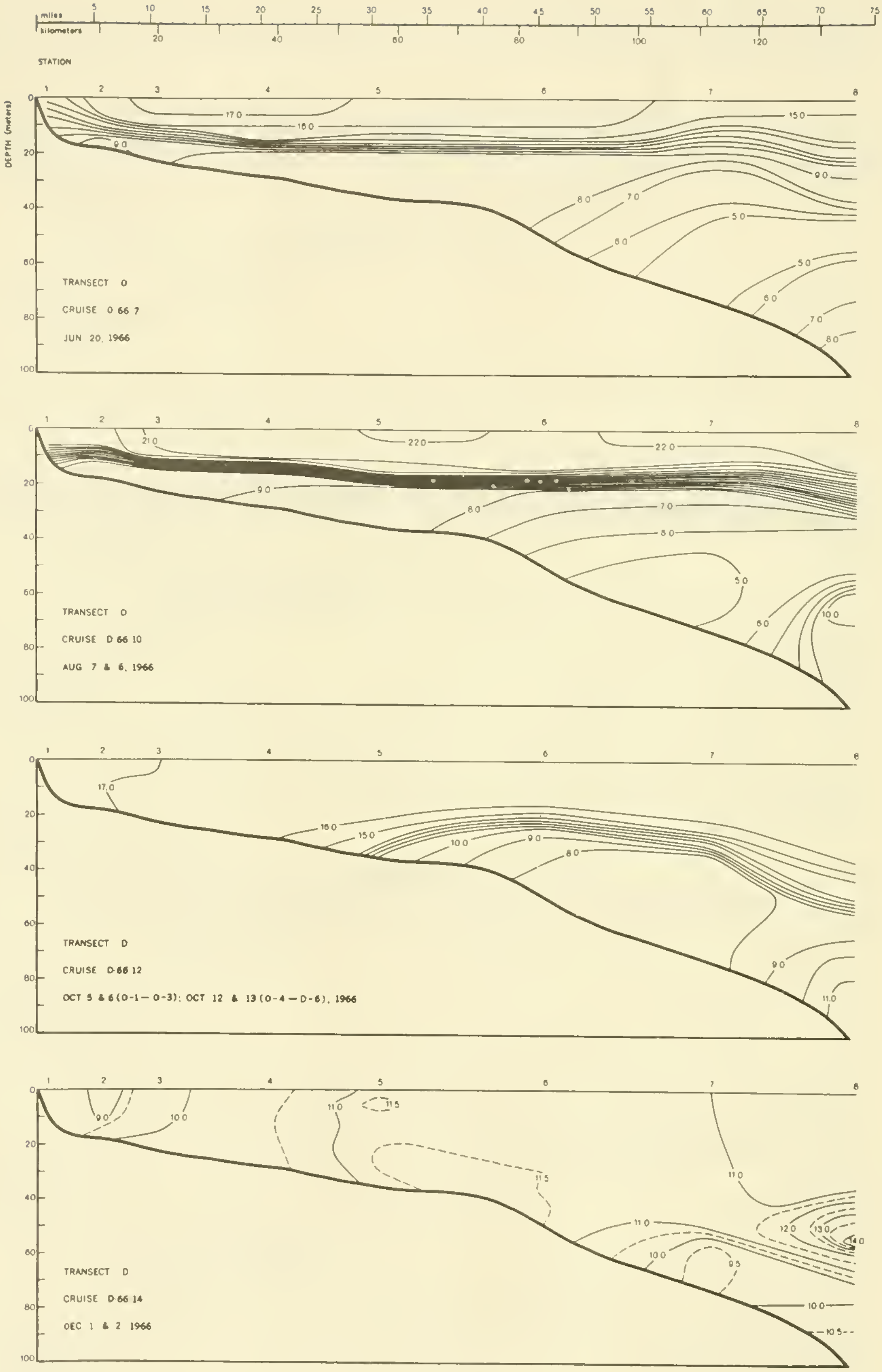
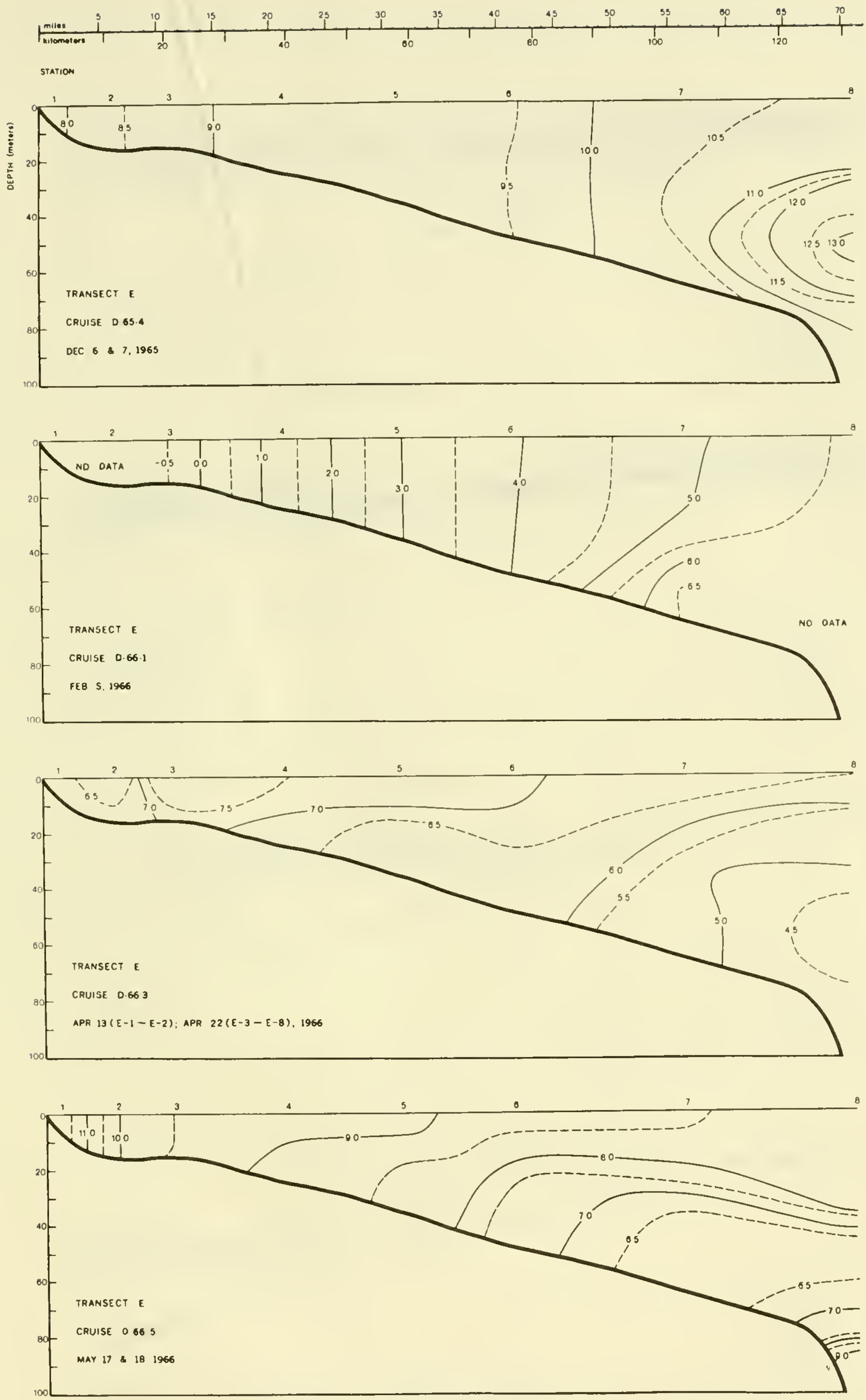

miles
kilometers
STATION
DEPTH (meters)
TRANSECT D
CRUISE D 65 4
DEC 5 & 6, 1965
TRANSECT D
CRUISE D-66-1
FEB 4, 1966
TRANSECT D
CRUISE D 66-3
APR 8 & 9, 1966
TRANSECT D
CRUISE D-66-6
MAY 16 & 17, 1966

Figure C7



miles
kilometers
STATION
DEPTH (meters)
TRANSECT D
CRUISE D 66 7
JUN 20, 1966
TRANSECT D
CRUISE D 66 10
AUG 7 & 6, 1966
TRANSECT D
CRUISE D-66 12
OCT 5 & 6 (D-1 — D-3); OCT 12 & 13 (D-4 — D-6), 1966
TRANSECT D
CRUISE D-66 14
DEC 1 & 2 1966

Figure C8



miles
kilometers
STATION
DEPTH (meters)
TRANSECT E
CRUISE D 65-4
DEC 6 & 7, 1965
TRANSECT E
CRUISE D-66-1
FEB 5, 1966
NO DATA
NO DATA
TRANSECT E
CRUISE D-66 3
APR 13 (E-1 — E-2); APR 22 (E-3 — E-8), 1966
TRANSECT E
CRUISE D 66 5
MAY 17 & 18 1966

Figure C9

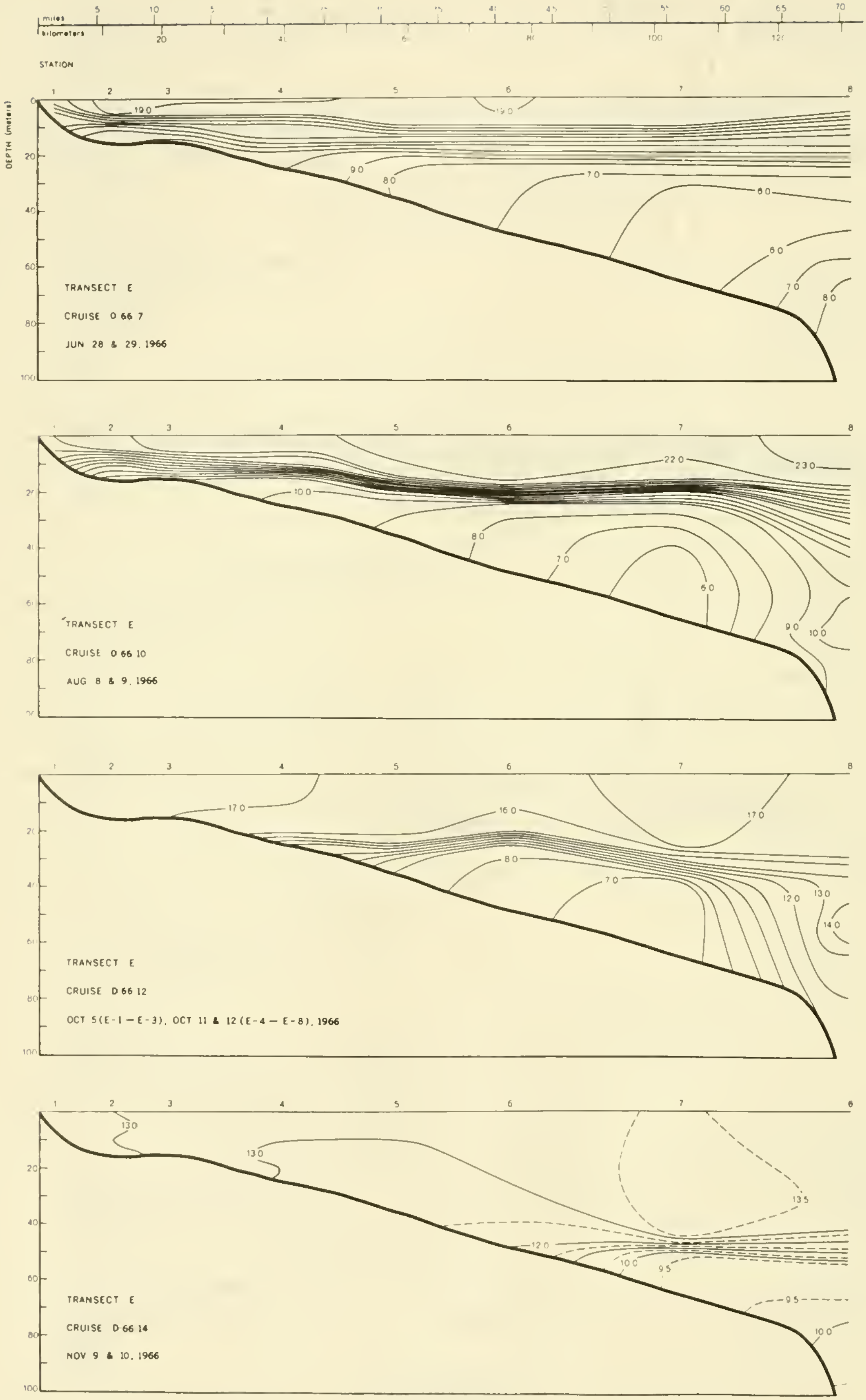

miles
kilometers
STATION
DEPTH (meters)
TRANSECT E
CRUISE 0 66 7
JUN 28 & 29, 1966
TRANSECT E
CRUISE 0 66 10
AUG 8 & 9, 1966
TRANSECT E
CRUISE D 66 12
OCT 5 (E-1 — E-3), OCT 11 & 12 (E-4 — E-8), 1966
TRANSECT E
CRUISE D 66 14
NOV 9 & 10, 1966

Figure C10

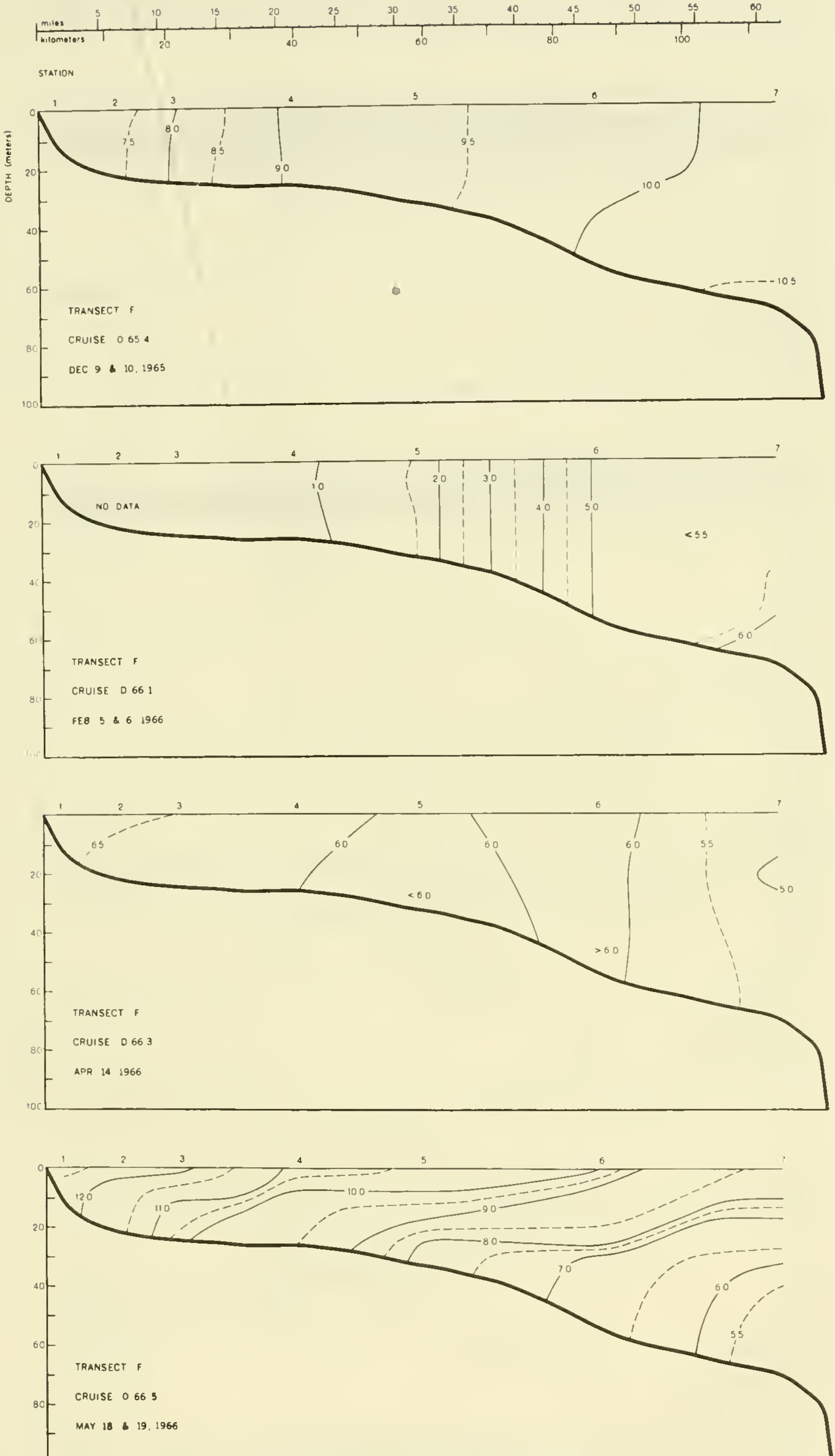

miles
kilometers
STATION
DEPTH (meters)
TRANSECT F
CRUISE 0 65 4
DEC 9 & 10, 1965
NO DATA
TRANSECT F
CRUISE D 66 1
FEB 5 & 6 1966
TRANSECT F
CRUISE D 66 3
APR 14 1966
TRANSECT F
CRUISE 0 66 5
MAY 18 & 19, 1966

Figure C11

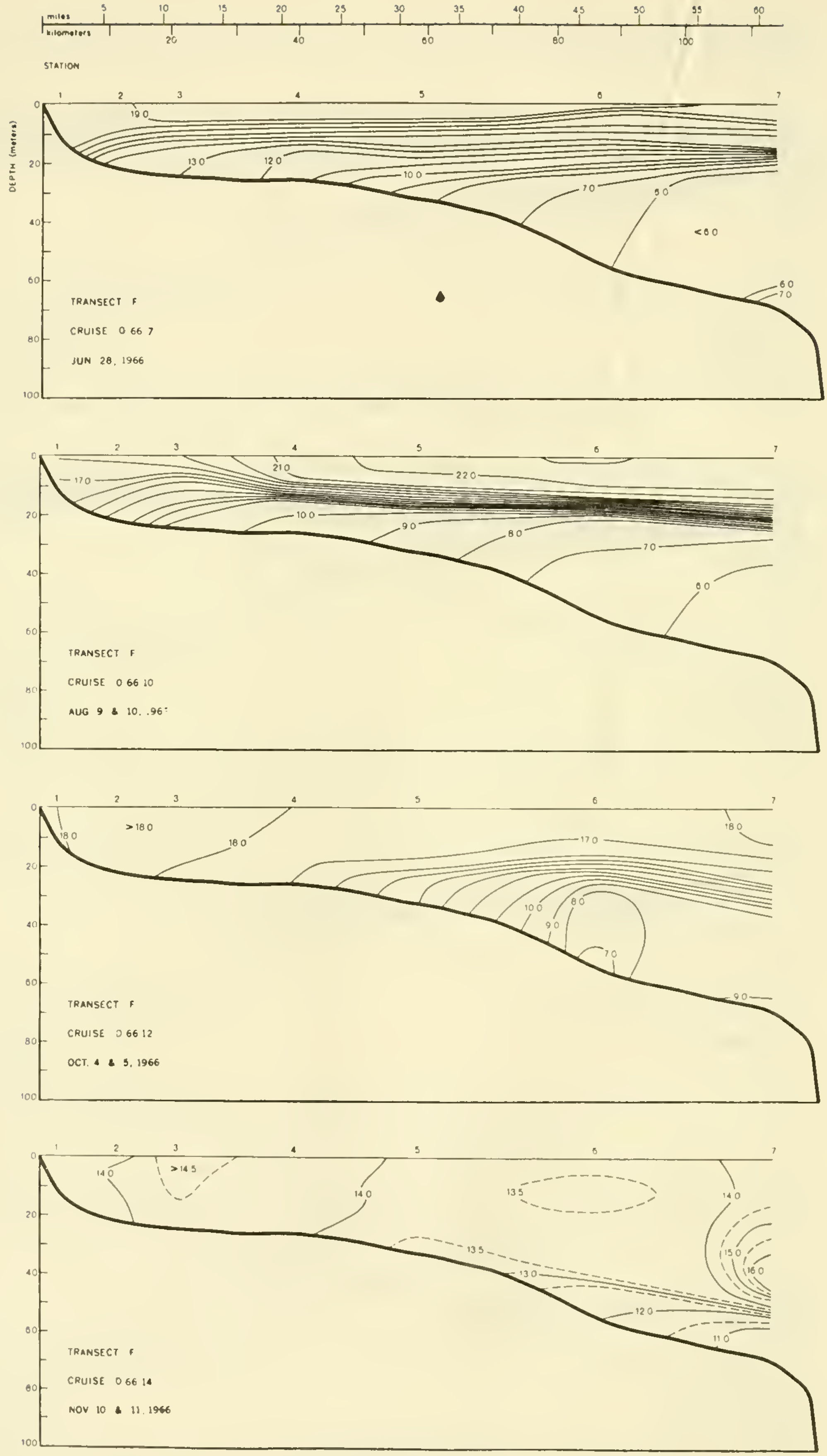

miles
kilometers
STATION
DEPTH (meters)
TRANSECT F
CRUISE 0 66 7
JUN 28, 1966
TRANSECT F
CRUISE 0 66 10
AUG 9 & 10, .96˙
TRANSECT F
CRUISE 0 66 12
OCT. 4 & 5, 1966
TRANSECT F
CRUISE 0 66 14
NOV 10 & 11, 1966

Figure C12

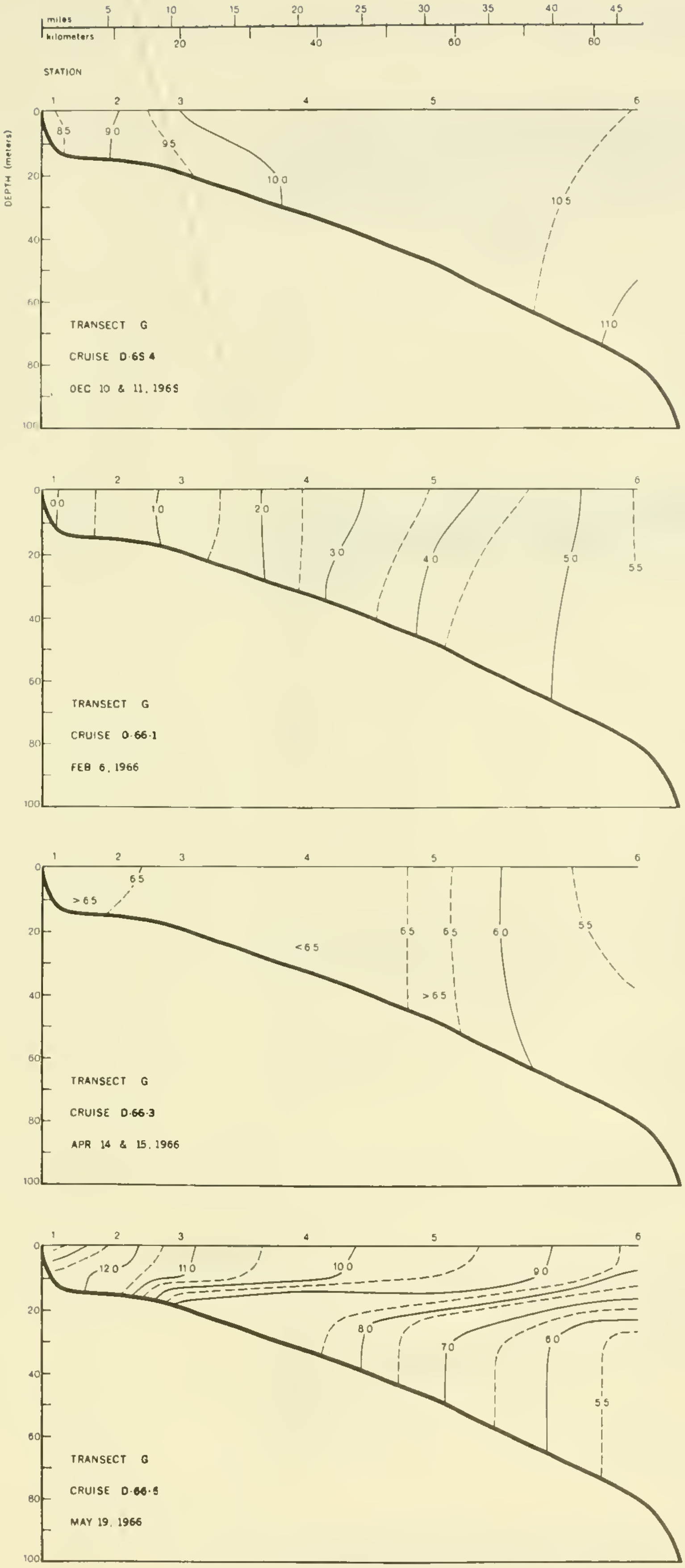

miles
kilometers
STATION
DEPTH (meters)
TRANSECT G
CRUISE D-65-4
DEC 10 & 11, 1965
TRANSECT G
CRUISE D-66-1
FEB 6, 1966
TRANSECT G
CRUISE D-66-3
APR 14 & 15, 1966
TRANSECT G
CRUISE D-66-5
MAY 19, 1966

Figure C13

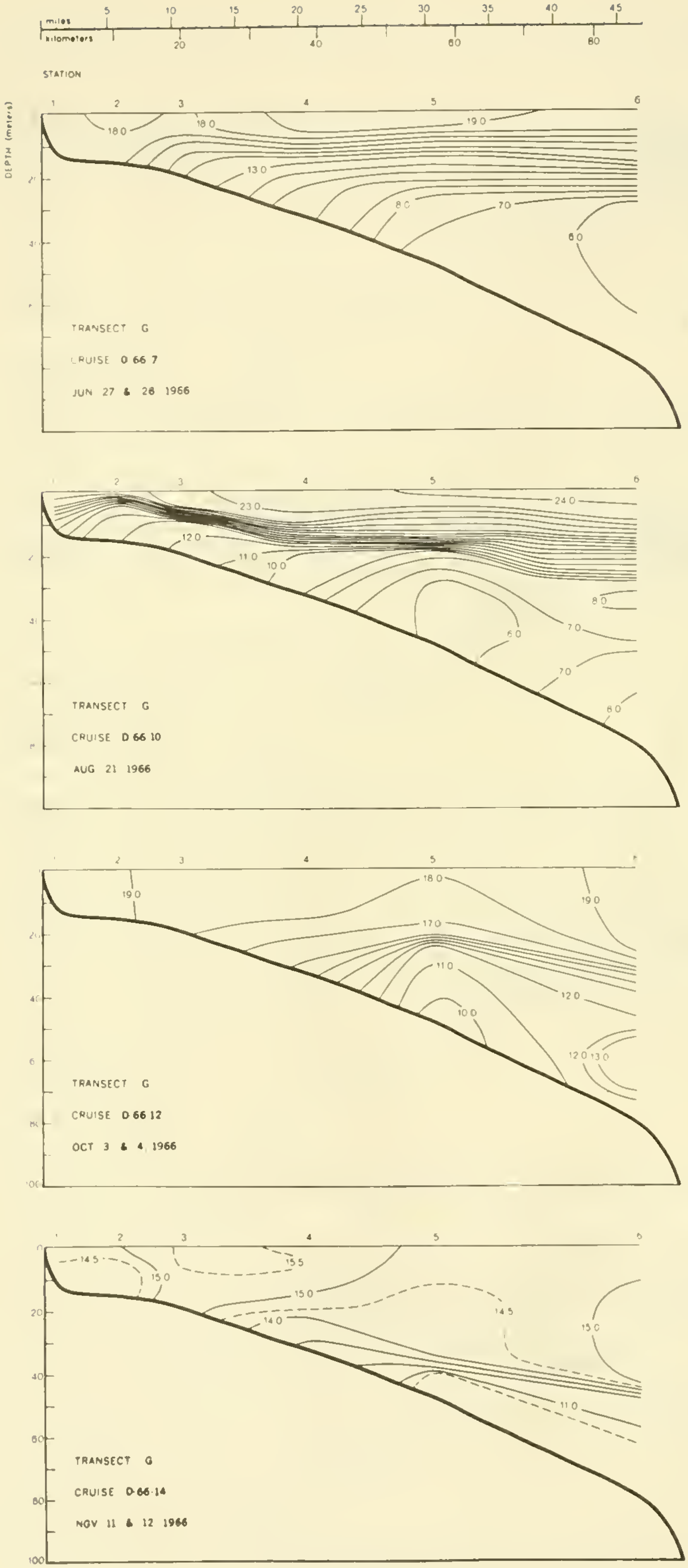

miles
kilometers
STATION
DEPTH (meters)
TRANSECT G
CRUISE D 66 7
JUN 27 & 28 1966
TRANSECT G
CRUISE D 66 10
AUG 21 1966
TRANSECT G
CRUISE D 66 12
OCT 3 & 4 1966
TRANSECT G
CRUISE D-66-14
NOV 11 & 12 1966

Figure C14

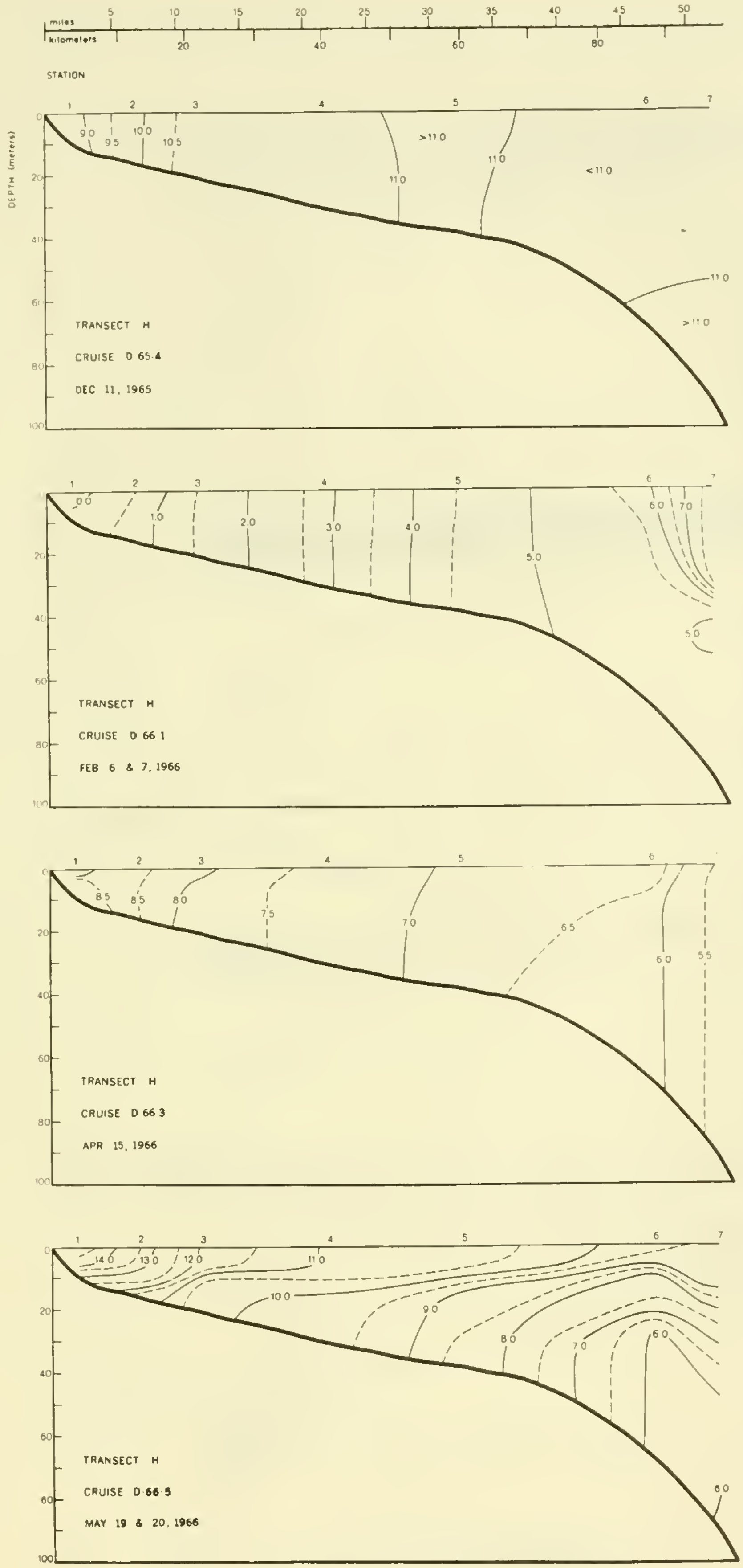

miles
kilometers
STATION
DEPTH (meters)
TRANSECT H
CRUISE D 65-4
DEC 11, 1965
TRANSECT H
CRUISE D 66 1
FEB 6 & 7, 1966
TRANSECT H
CRUISE D 66 3
APR 15, 1966
TRANSECT H
CRUISE D-66-5
MAY 19 & 20, 1966

Figure C15

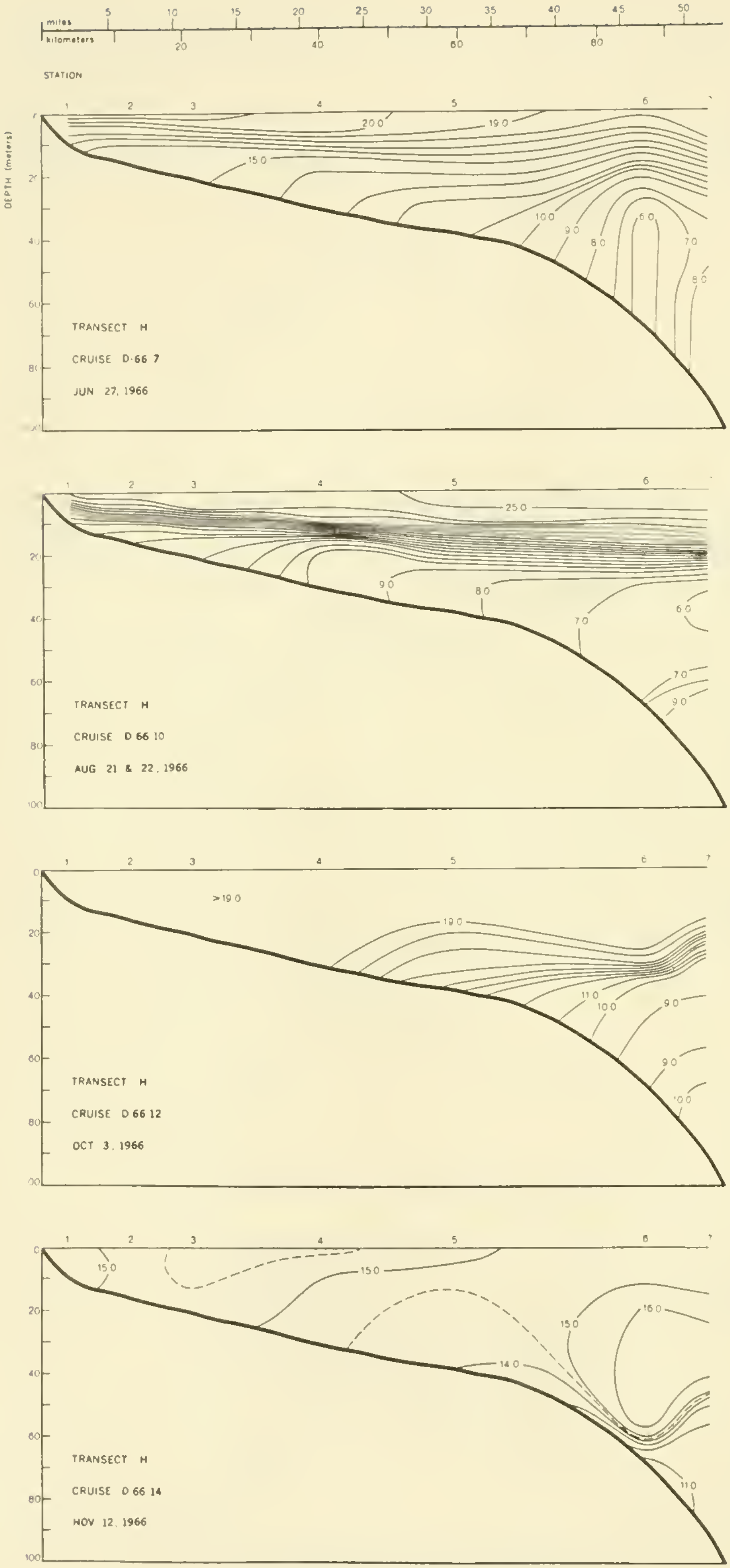

miles
kilometers
STATION
DEPTH (meters)
TRANSECT H
CRUISE D-66 7
JUN 27, 1966
TRANSECT H
CRUISE D 66 10
AUG 21 & 22, 1966
TRANSECT H
CRUISE D 66 12
OCT 3, 1966
TRANSECT H
CRUISE D 66 14
NOV 12, 1966

Figure C16

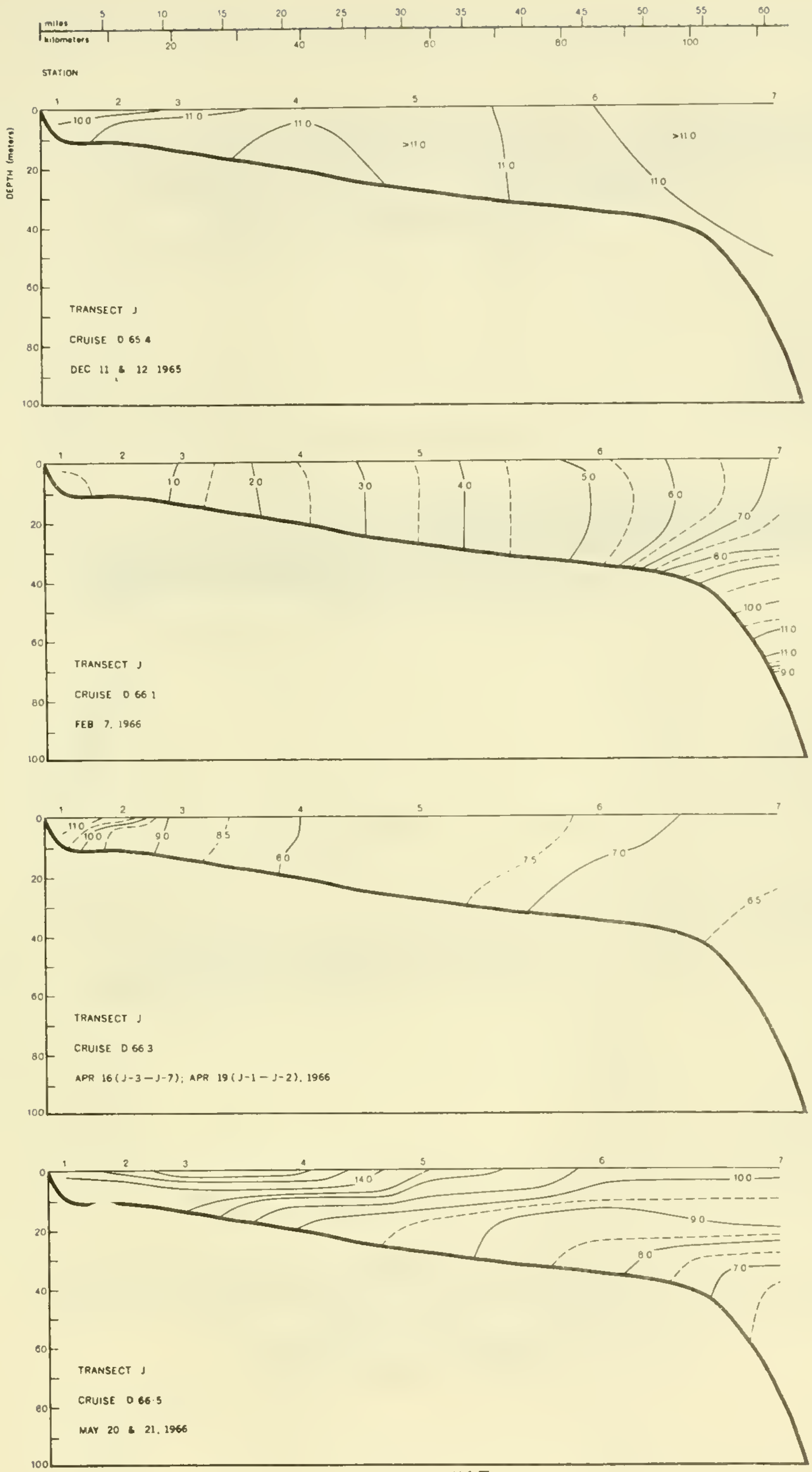
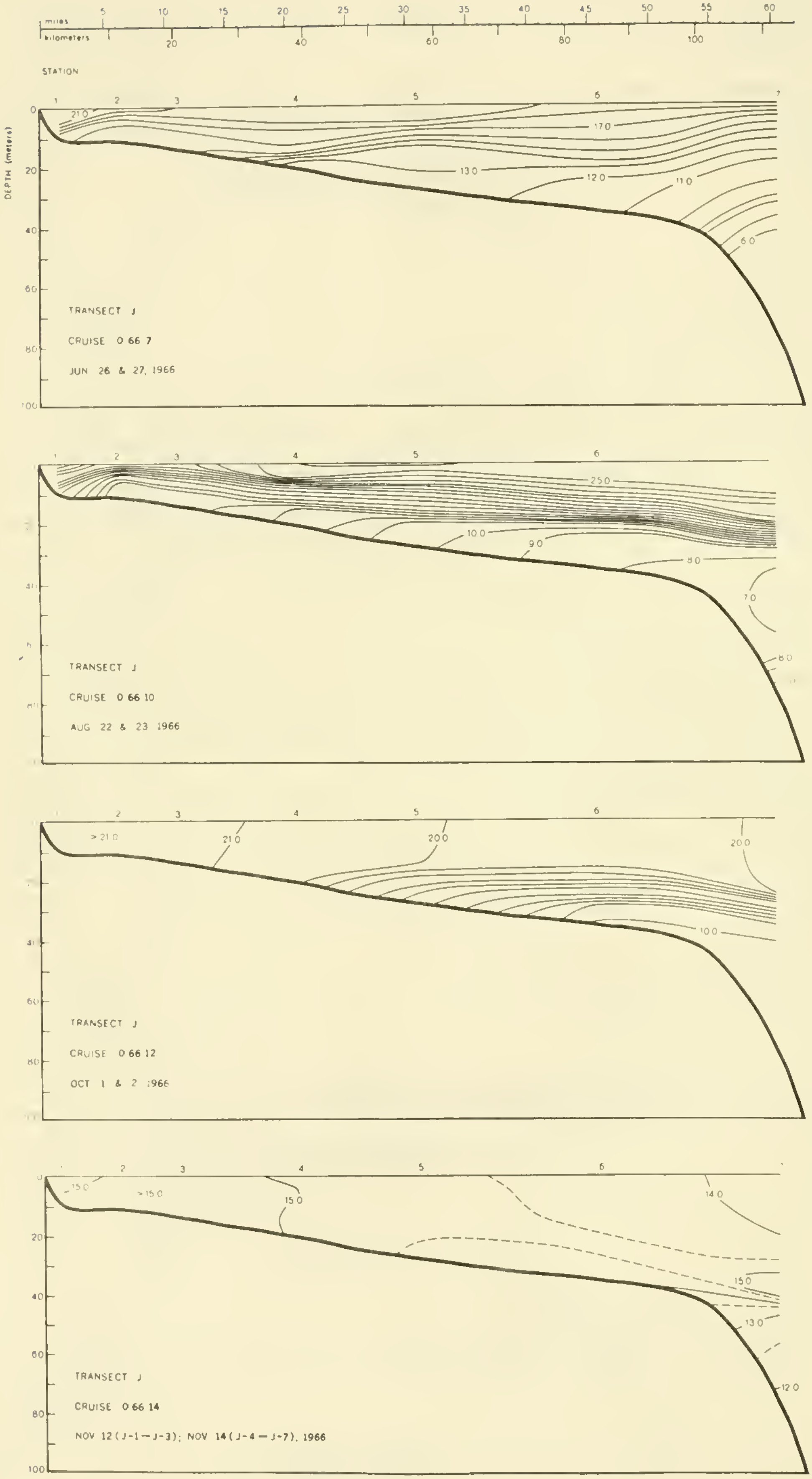

miles
kilometers
STATION
DEPTH (meters)
TRANSECT J
CRUISE D 65 4
DEC 11 & 12 1965
TRANSECT J
CRUISE D 66 1
FEB 7, 1966
TRANSECT J
CRUISE D 66 3
APR 16 (J-3 — J-7); APR 19 (J-1 — J-2), 1966
TRANSECT J
CRUISE D 66·5
MAY 20 & 21, 1966

Figure C17



miles
kilometers
STATION
DEPTH (meters)
TRANSECT J
CRUISE 0 66 7
JUN 26 & 27, 1966
TRANSECT J
CRUISE 0 66 10
AUG 22 & 23 1966
TRANSECT J
CRUISE 0 66 12
OCT 1 & 2 1966
TRANSECT J
CRUISE 0 66 14
NOV 12 (J-1—J-3); NOV 14 (J-4—J-7), 1966

Figure C18

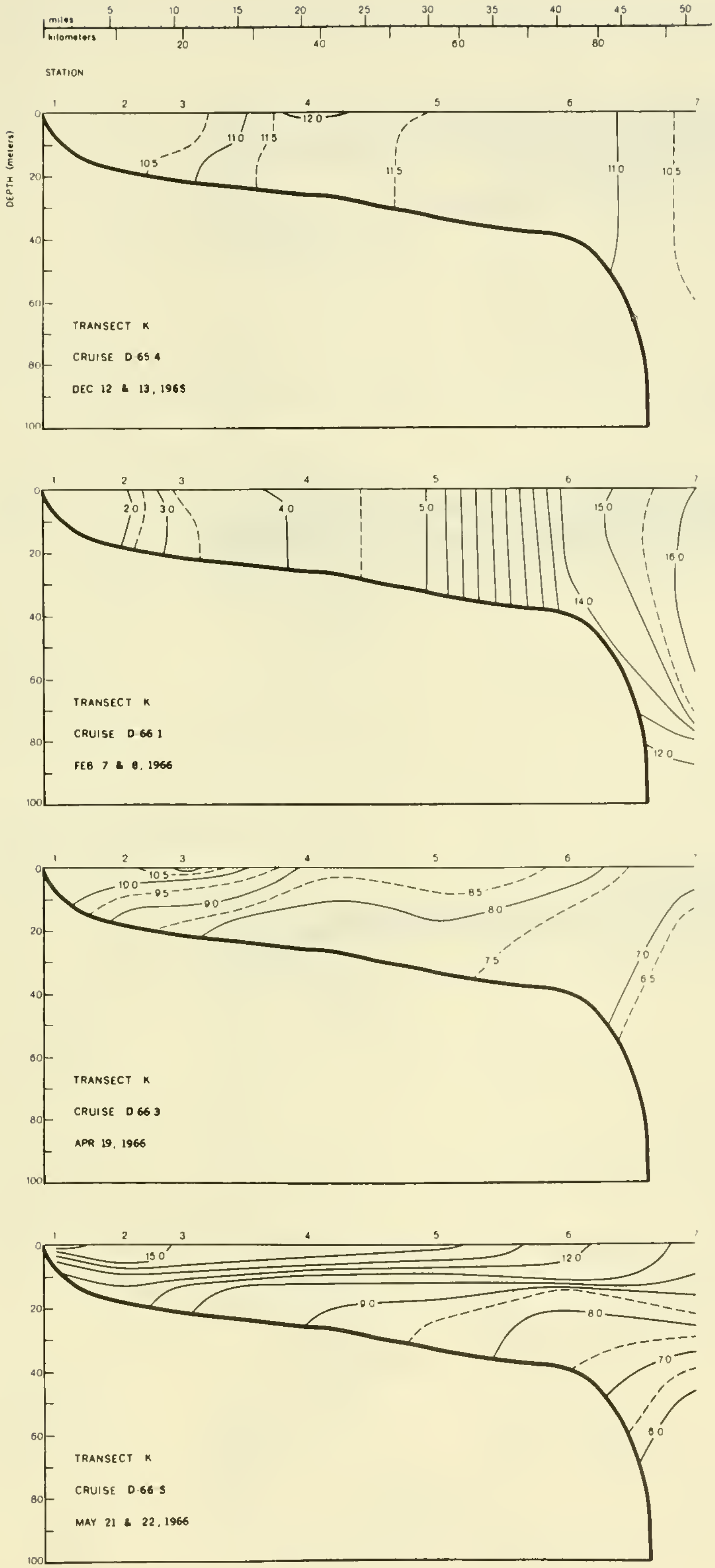
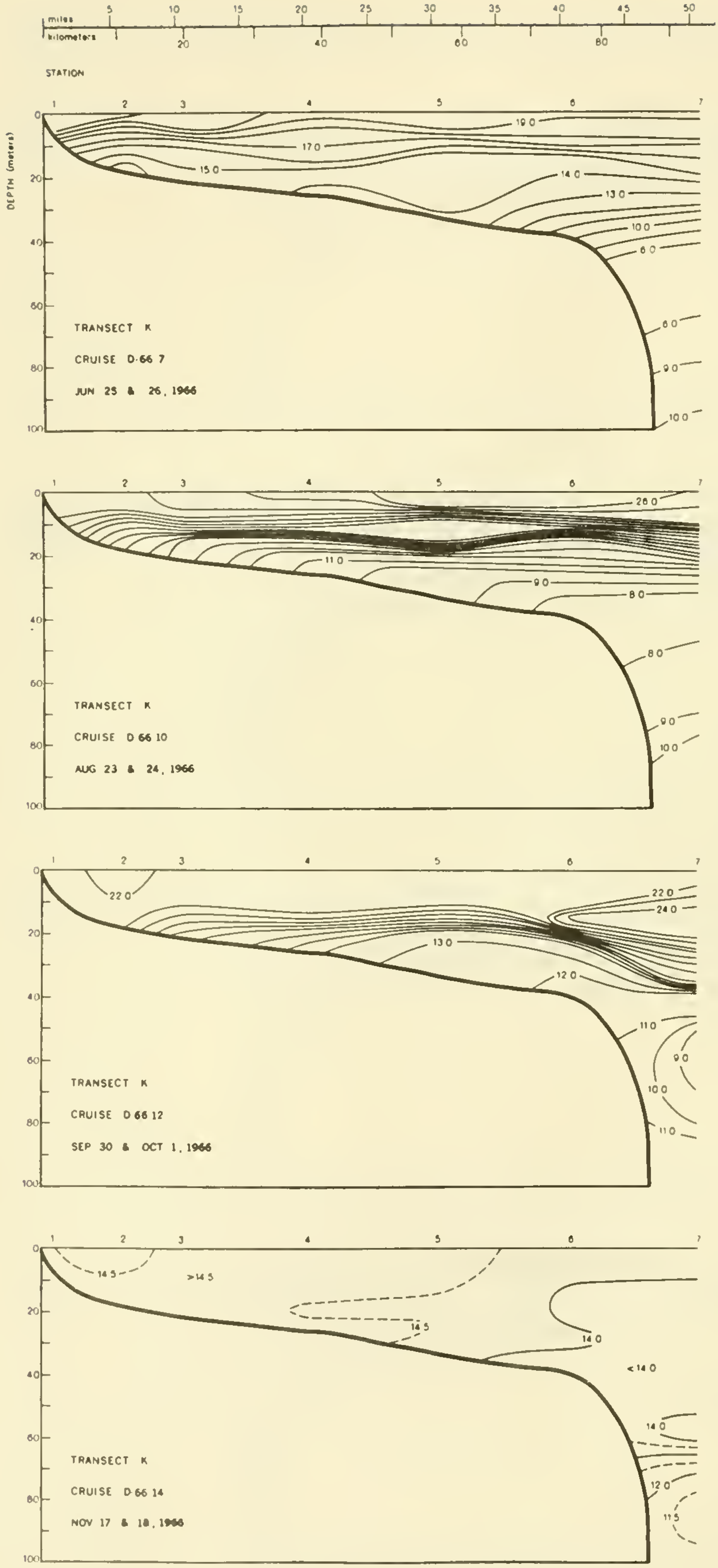

miles
kilometers
STATION
DEPTH (meters)
TRANSECT K
CRUISE D 65 4
DEC 12 & 13, 1965
TRANSECT K
CRUISE D 66 1
FEB 7 & 8, 1966
TRANSECT K
CRUISE D 66 3
APR 19, 1966
TRANSECT K
CRUISE D 66 5
MAY 21 & 22, 1966

Figure C19



miles
kilometers
STATION
DEPTH (meters)
TRANSECT K
CRUISE D-66 7
JUN 25 & 26, 1966
TRANSECT K
CRUISE D 66 10
AUG 23 & 24, 1966
TRANSECT K
CRUISE D 66 12
SEP 30 & OCT 1, 1966
TRANSECT K
CRUISE D 66 14
NOV 17 & 18, 1966

Figure C20

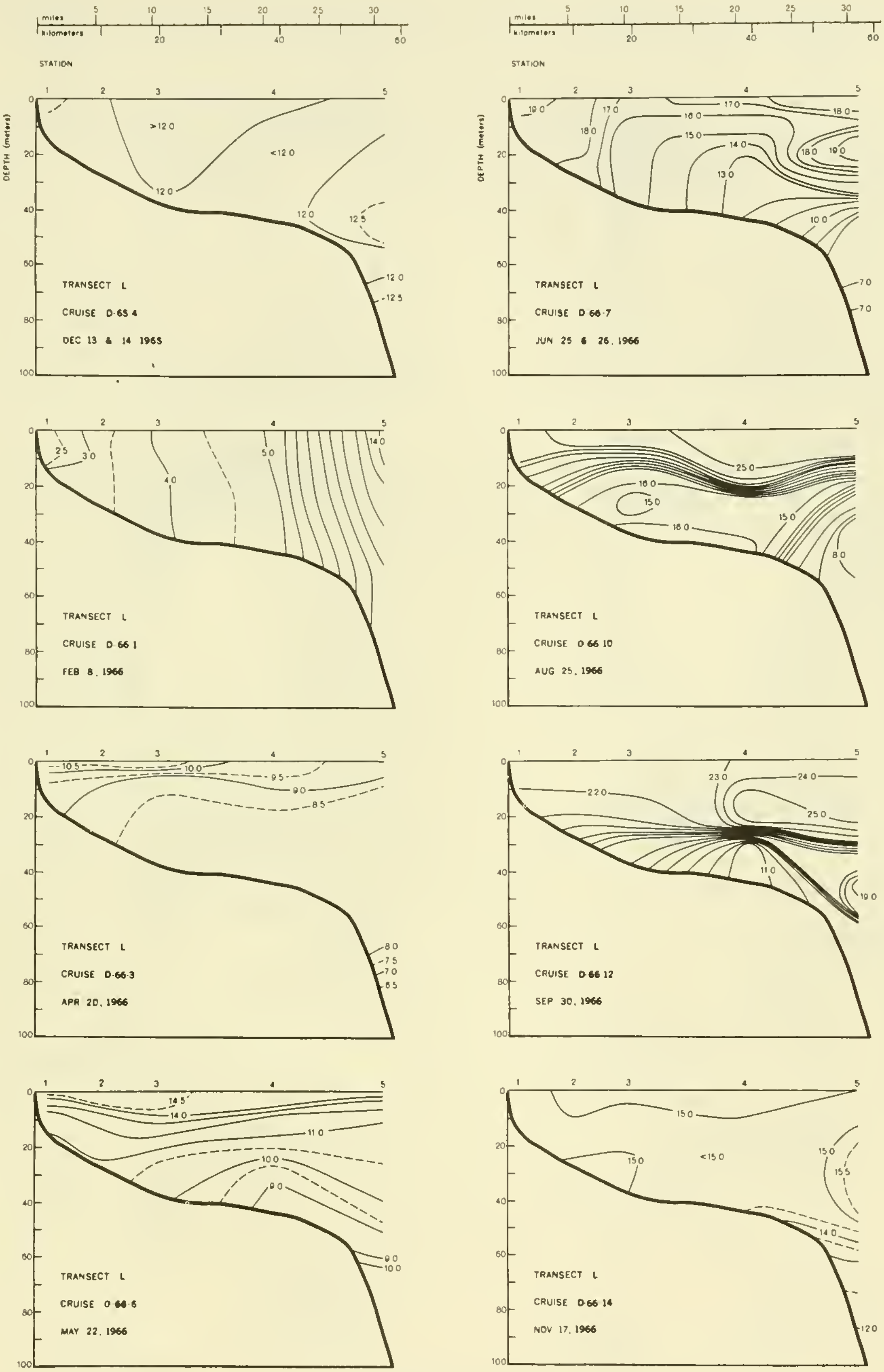

miles
kilometers
STATION
DEPTH (meters)
TRANSECT L
CRUISE D-65-4
DEC 13 & 14 1965
TRANSECT L
CRUISE D 66-7
JUN 25 & 26, 1966
TRANSECT L
CRUISE D-66-1
FEB 8, 1966
TRANSECT L
CRUISE D 66 10
AUG 25, 1966
TRANSECT L
CRUISE D-66-3
APR 20, 1966
TRANSECT L
CRUISE D-66 12
SEP 30, 1966
TRANSECT L
CRUISE D-66-6
MAY 22, 1966
TRANSECT L
CRUISE D-66 14
NOV 17, 1966

Figure C21

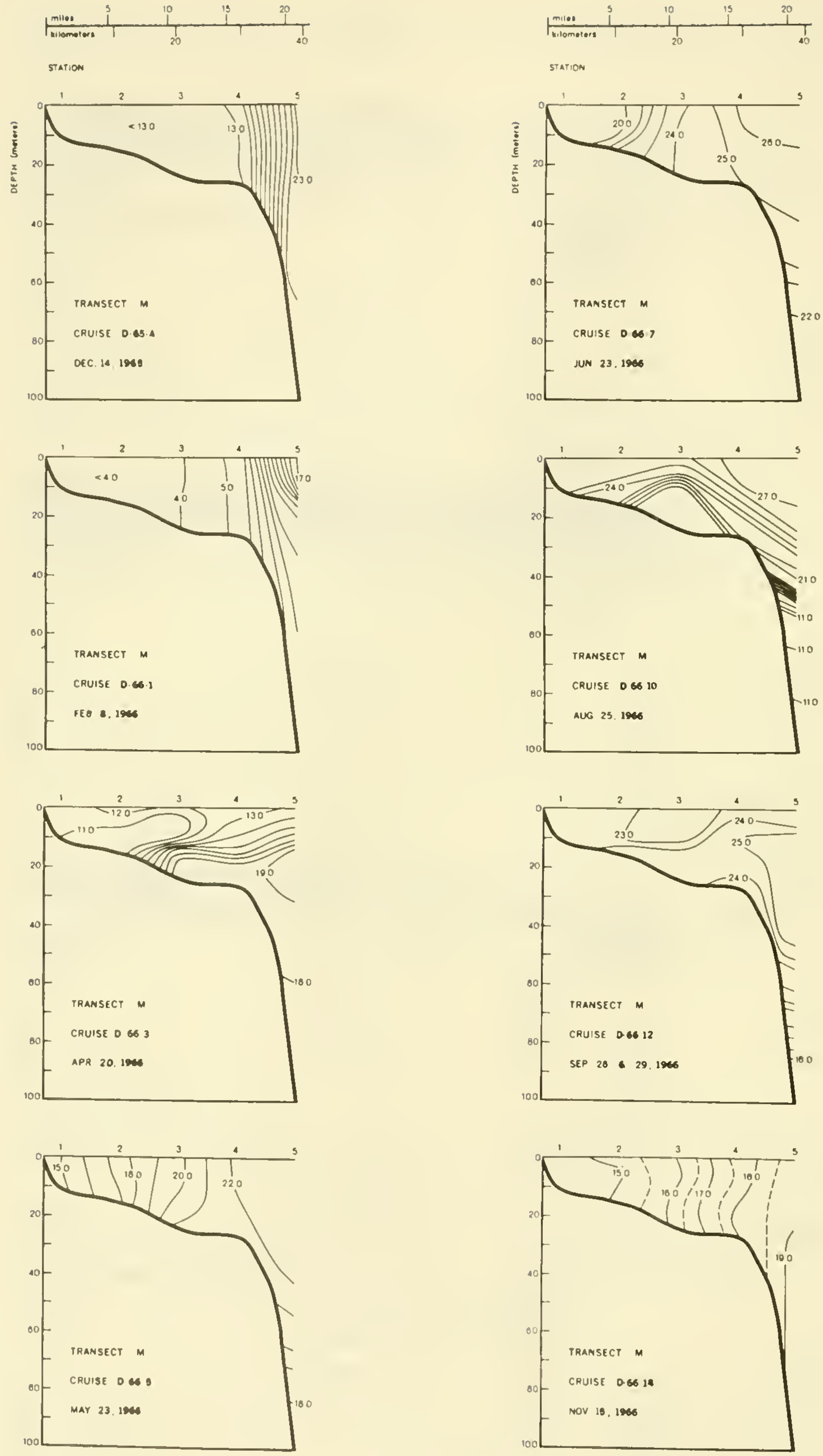
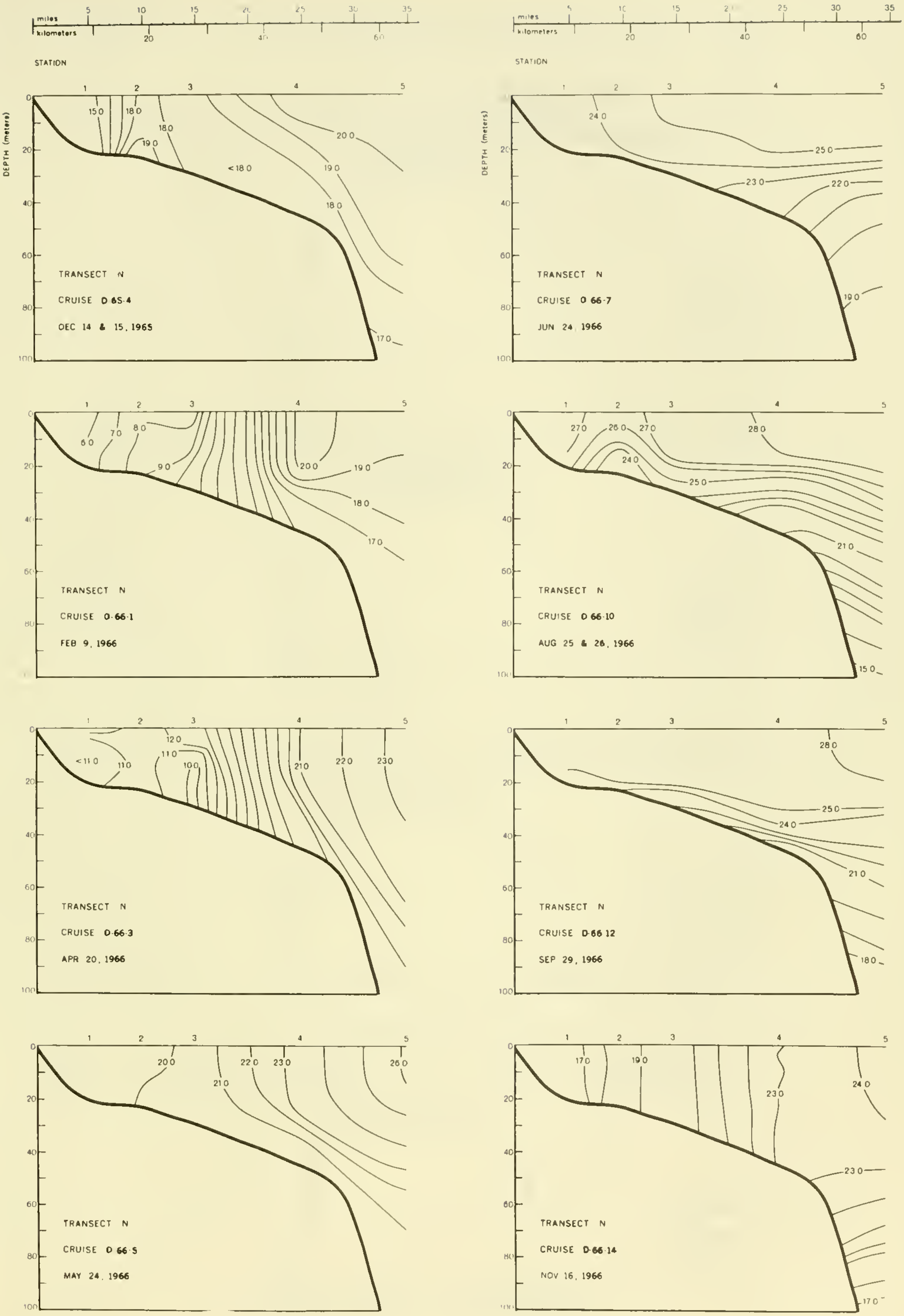
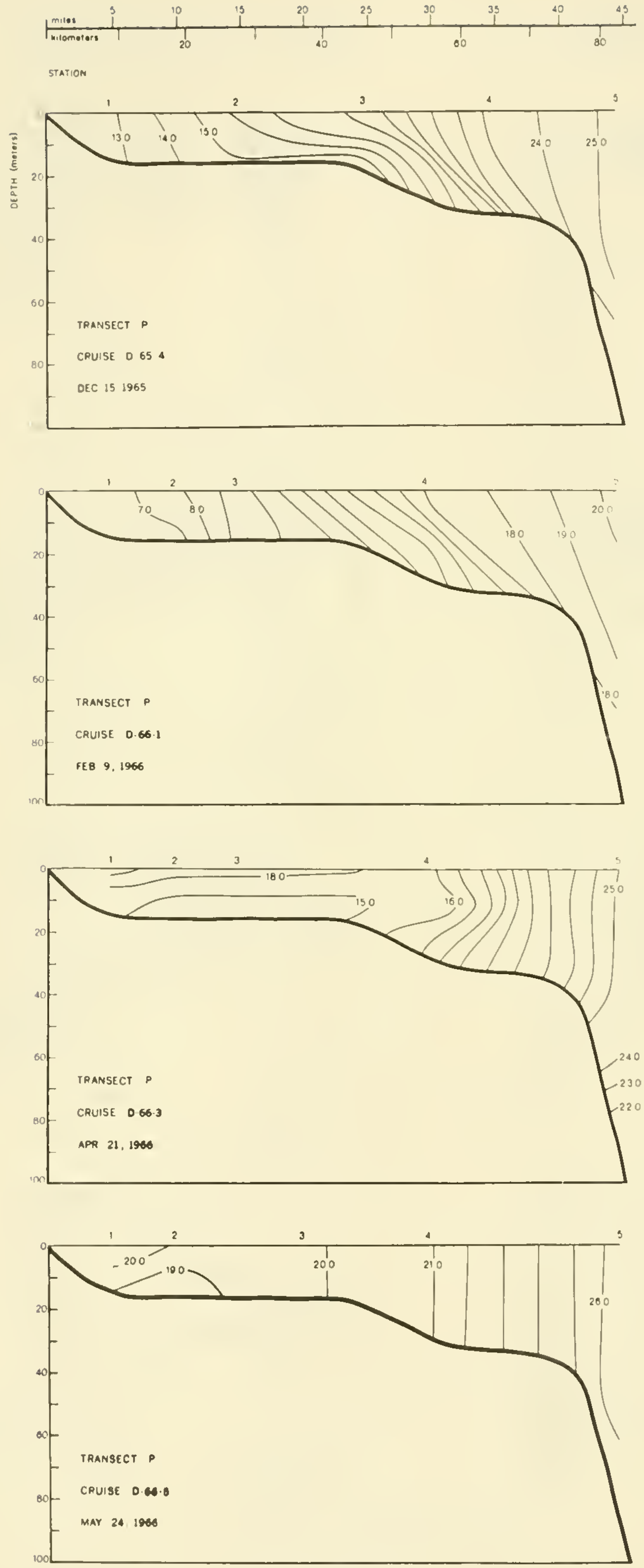

miles
kilometers
STATION
DEPTH (meters)
TRANSECT M
CRUISE D-65-4
DEC. 14, 1965
TRANSECT M
CRUISE D-66-7
JUN 23, 1966
TRANSECT M
CRUISE D-66-1
FEB 8, 1966
TRANSECT M
CRUISE D 66 10
AUG 25, 1966
TRANSECT M
CRUISE D 66 3
APR 20, 1966
TRANSECT M
CRUISE D-66 12
SEP 28 & 29, 1966
TRANSECT M
CRUISE D 66 5
MAY 23, 1966
TRANSECT M
CRUISE D-66 14
NOV 18, 1966

Figure C22



miles
kilometers
STATION
DEPTH (meters)
TRANSECT N
CRUISE O 65-4
DEC 14 & 15, 1965
TRANSECT N
CRUISE O 66-7
JUN 24, 1966
TRANSECT N
CRUISE O-66-1
FEB 9, 1966
TRANSECT N
CRUISE O 66-10
AUG 25 & 26, 1966
TRANSECT N
CRUISE O-66-3
APR 20, 1966
TRANSECT N
CRUISE O-66 12
SEP 29, 1966
TRANSECT N
CRUISE O 66-5
MAY 24, 1966
TRANSECT N
CRUISE O-66-14
NOV 16, 1966

Figure C23



miles
kilometers
STATION
DEPTH (meters)
TRANSECT P
CRUISE D 65 4
DEC 15 1965
TRANSECT P
CRUISE D-66-1
FEB 9, 1966
TRANSECT P
CRUISE D 66-3
APR 21, 1966
TRANSECT P
CRUISE D-66-8
MAY 24 1966

Figure C24

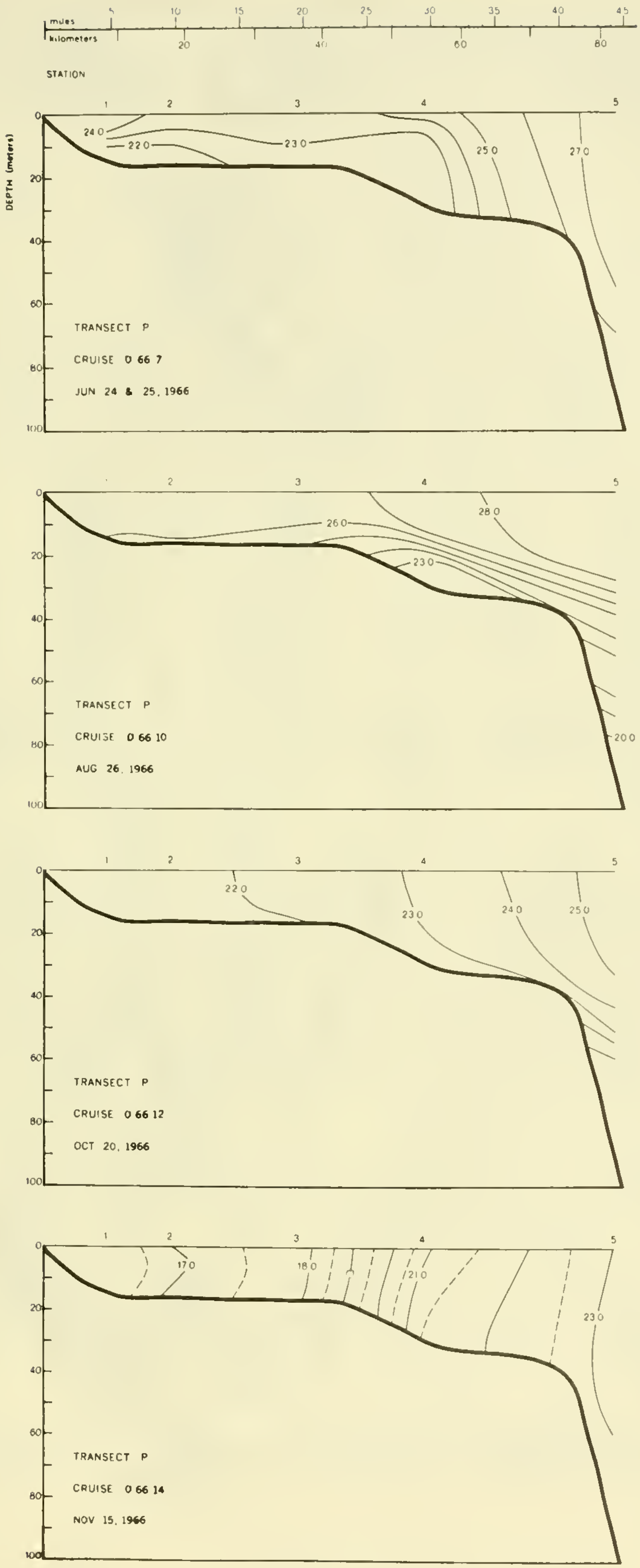

miles
kilometers
STATION
DEPTH (meters)
TRANSECT P
CRUISE 0 66 7
JUN 24 & 25, 1966
TRANSECT P
CRUISE 0 66 10
AUG 26, 1966
TRANSECT P
CRUISE 0 66 12
OCT 20, 1966
TRANSECT P
CRUISE 0 66 14
NOV 15, 1966

Figure C25

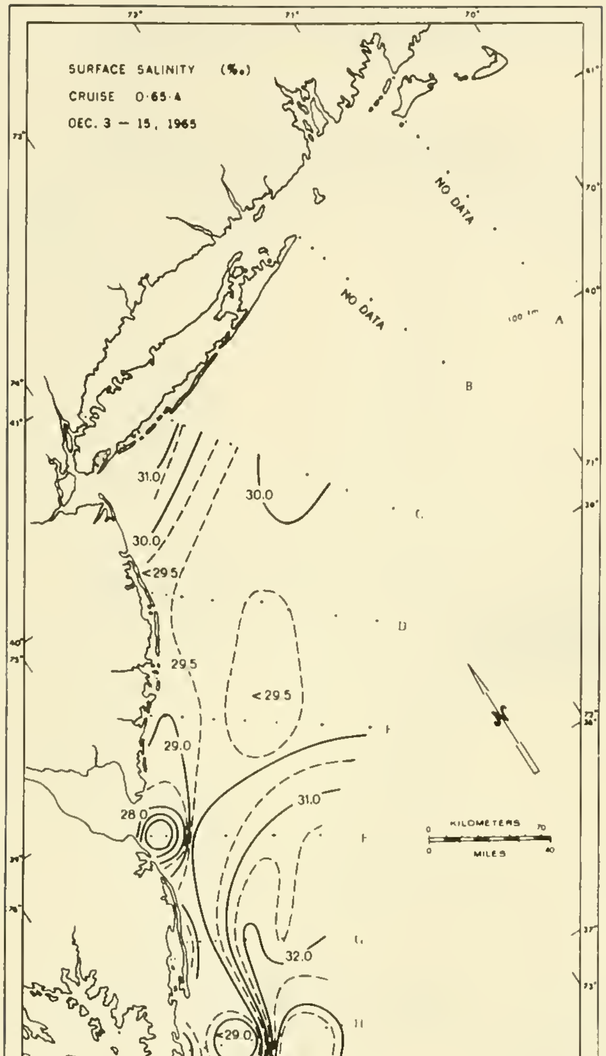


Figure D1

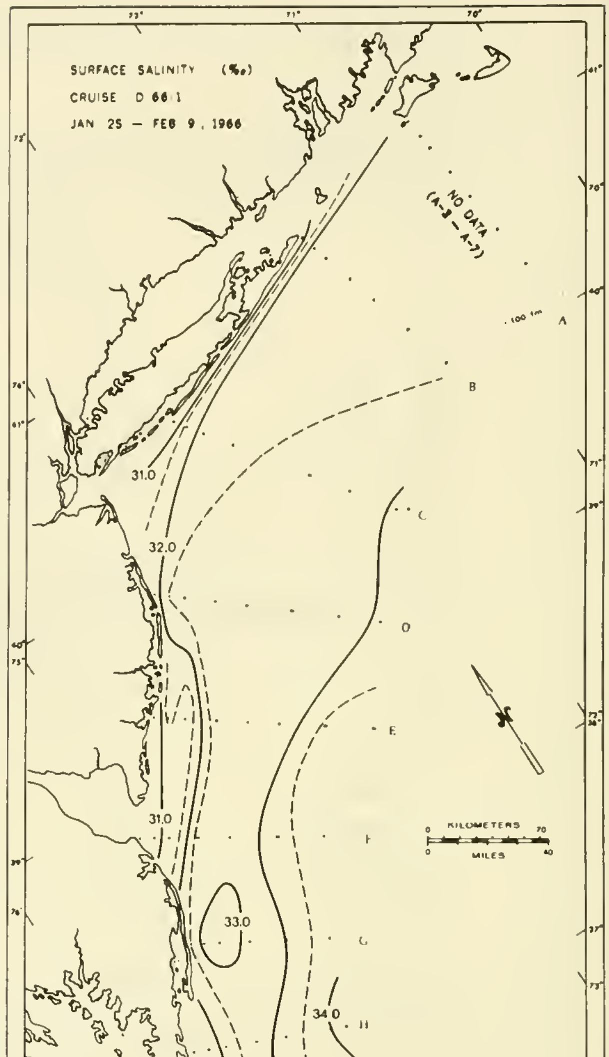


Figure D2

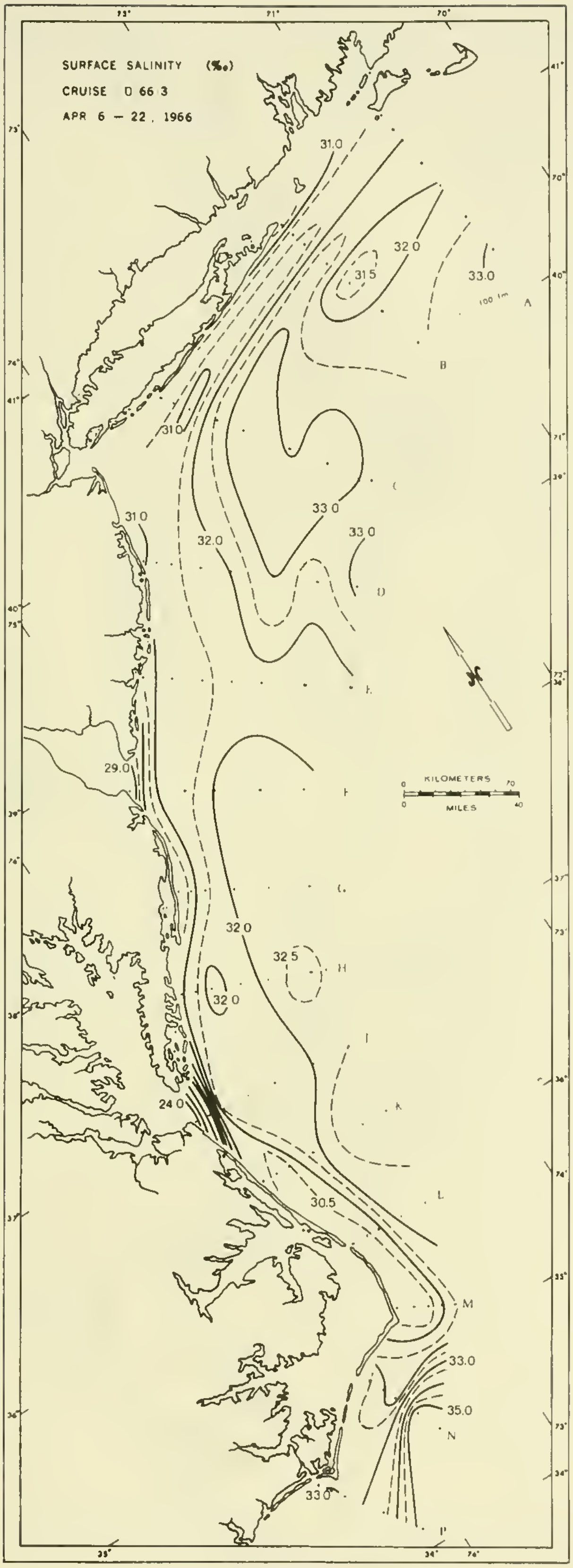


Figure D3

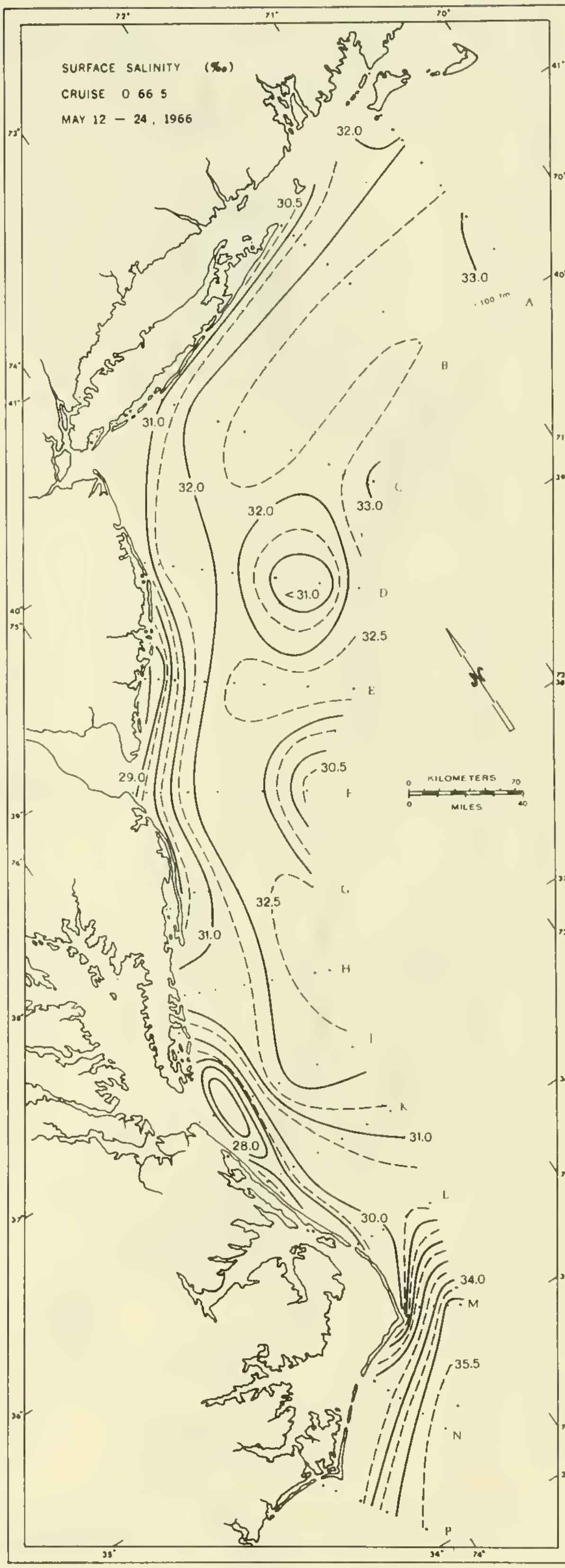


Figure D4

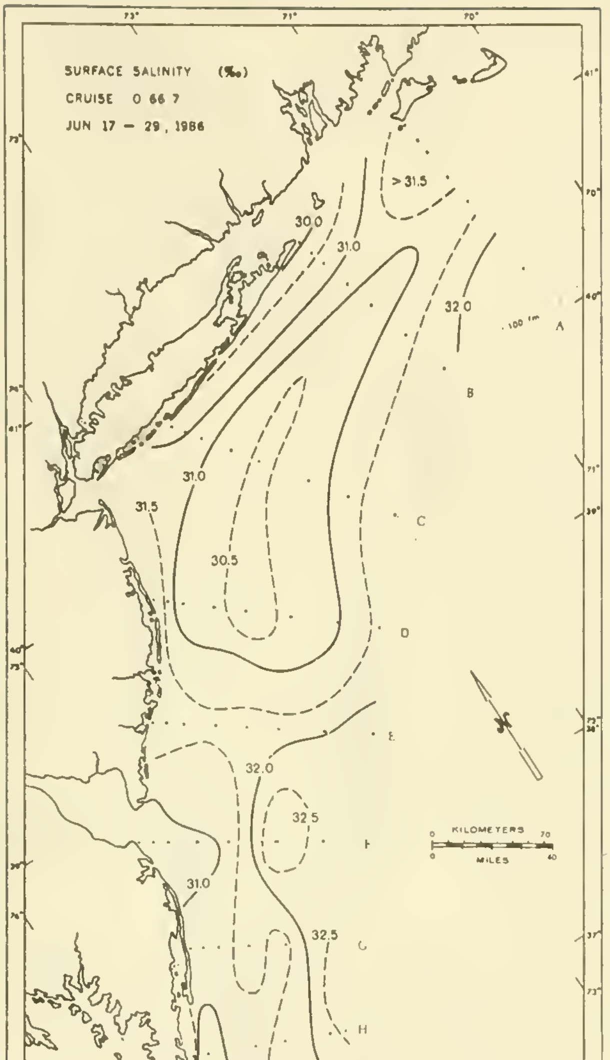


Figure D5

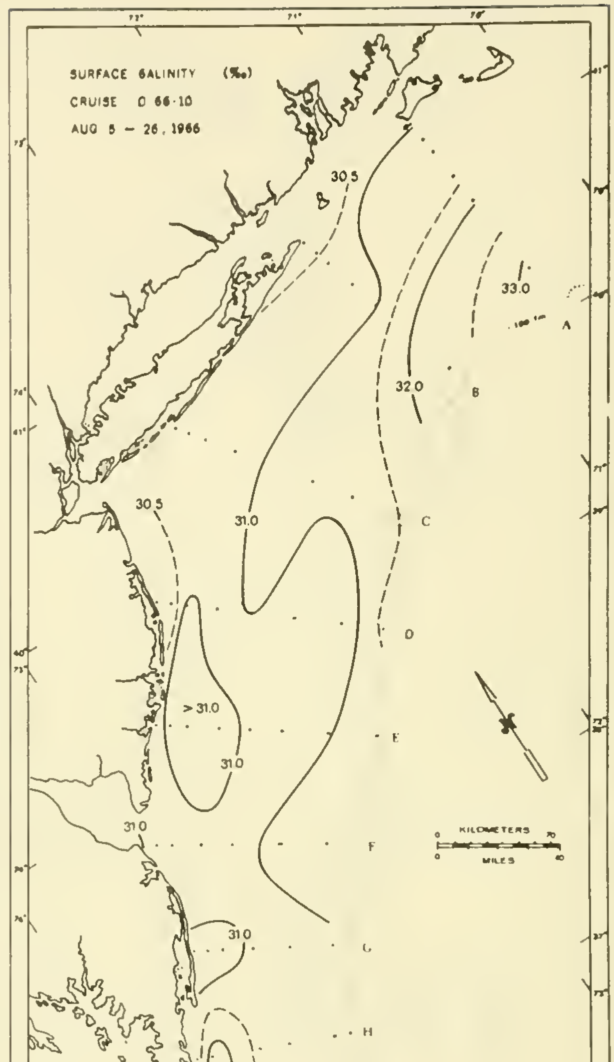


Figure D6

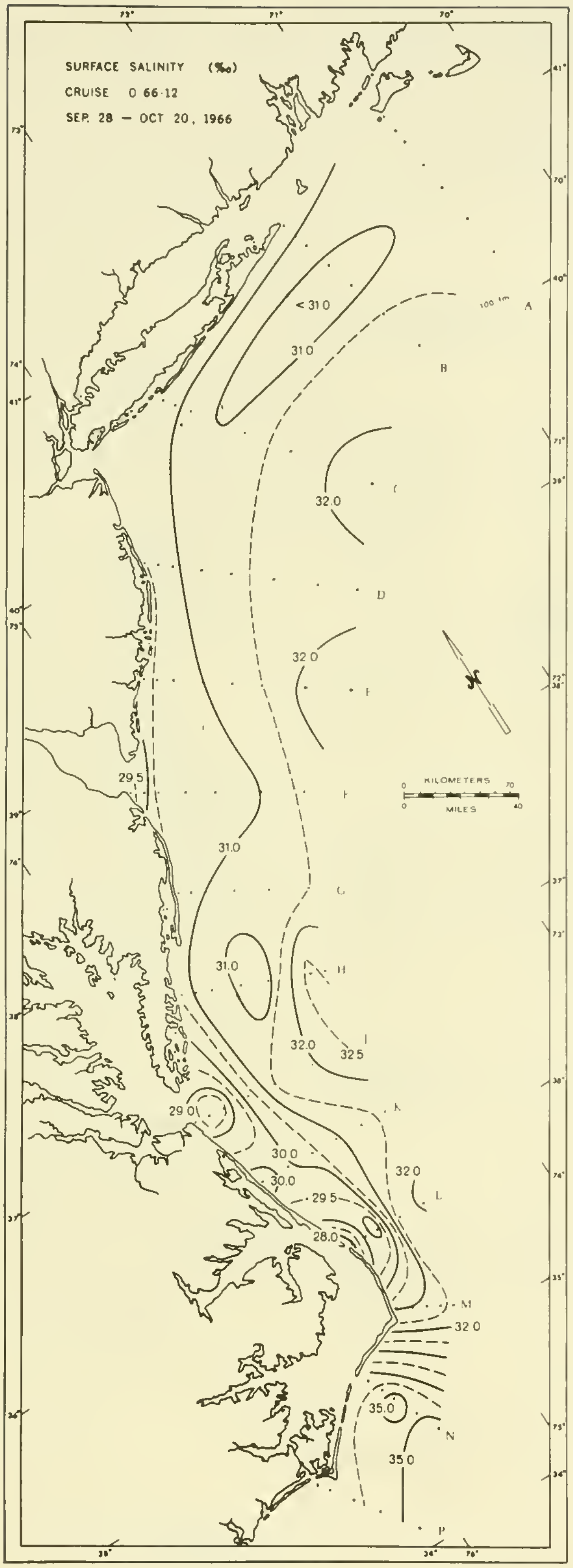


Figure D7

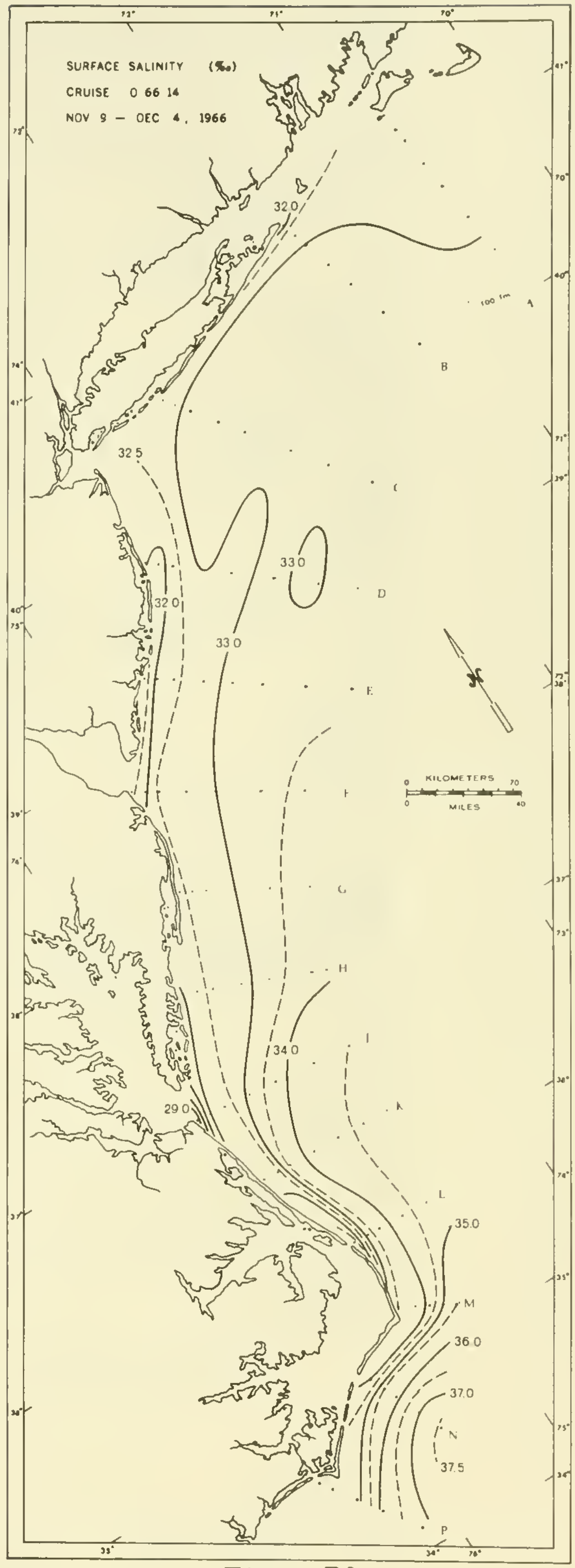


Figure D8

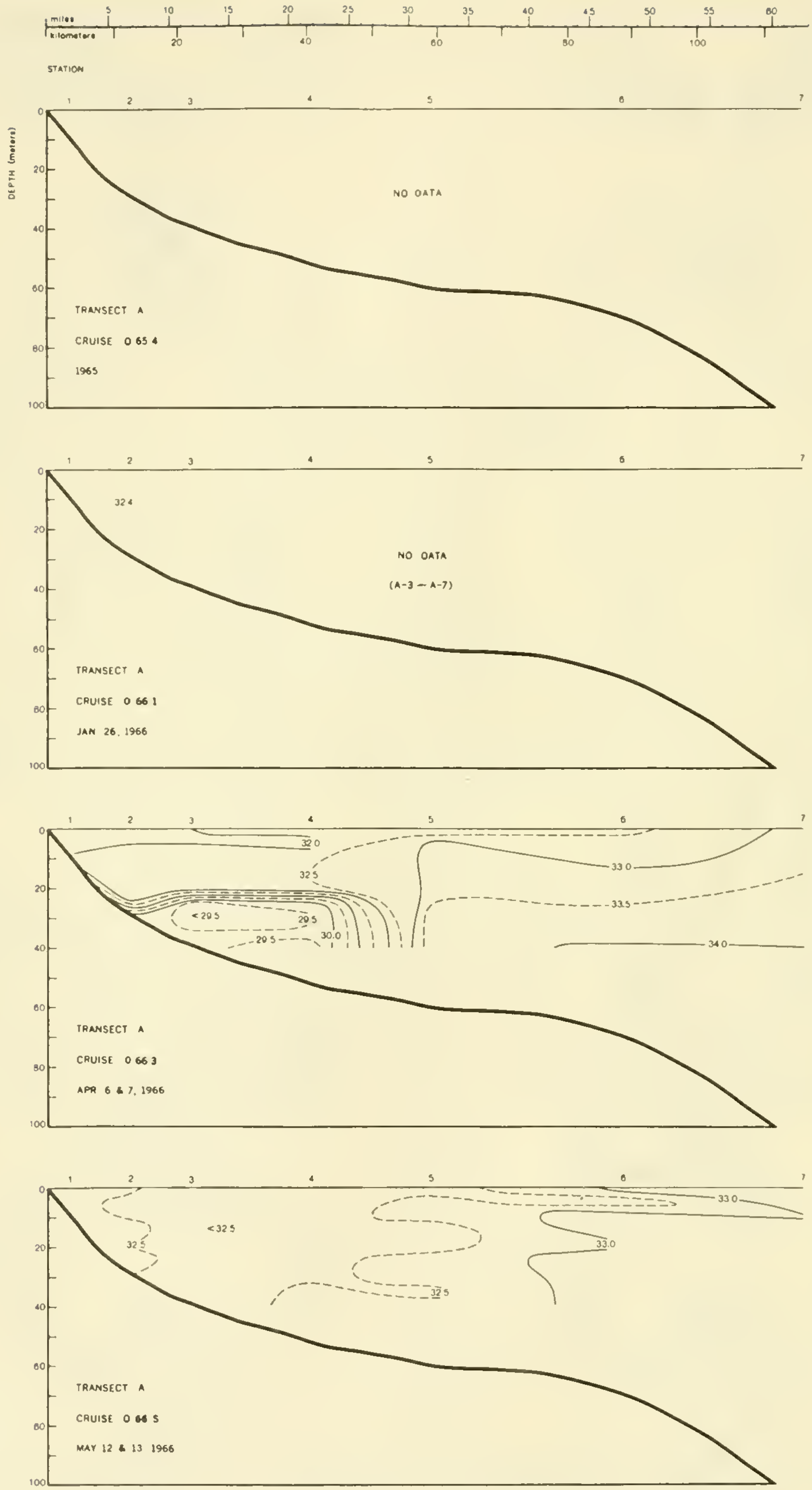

miles
kilometers
STATION
DEPTH (meters)
NO DATA
TRANSECT A
CRUISE 0 65 4
1965
NO DATA
(A-3 — A-7)
TRANSECT A
CRUISE 0 66 1
JAN 26, 1966
TRANSECT A
CRUISE 0 66 3
APR 6 & 7, 1966
TRANSECT A
CRUISE 0 66 5
MAY 12 & 13 1966

Figure E1

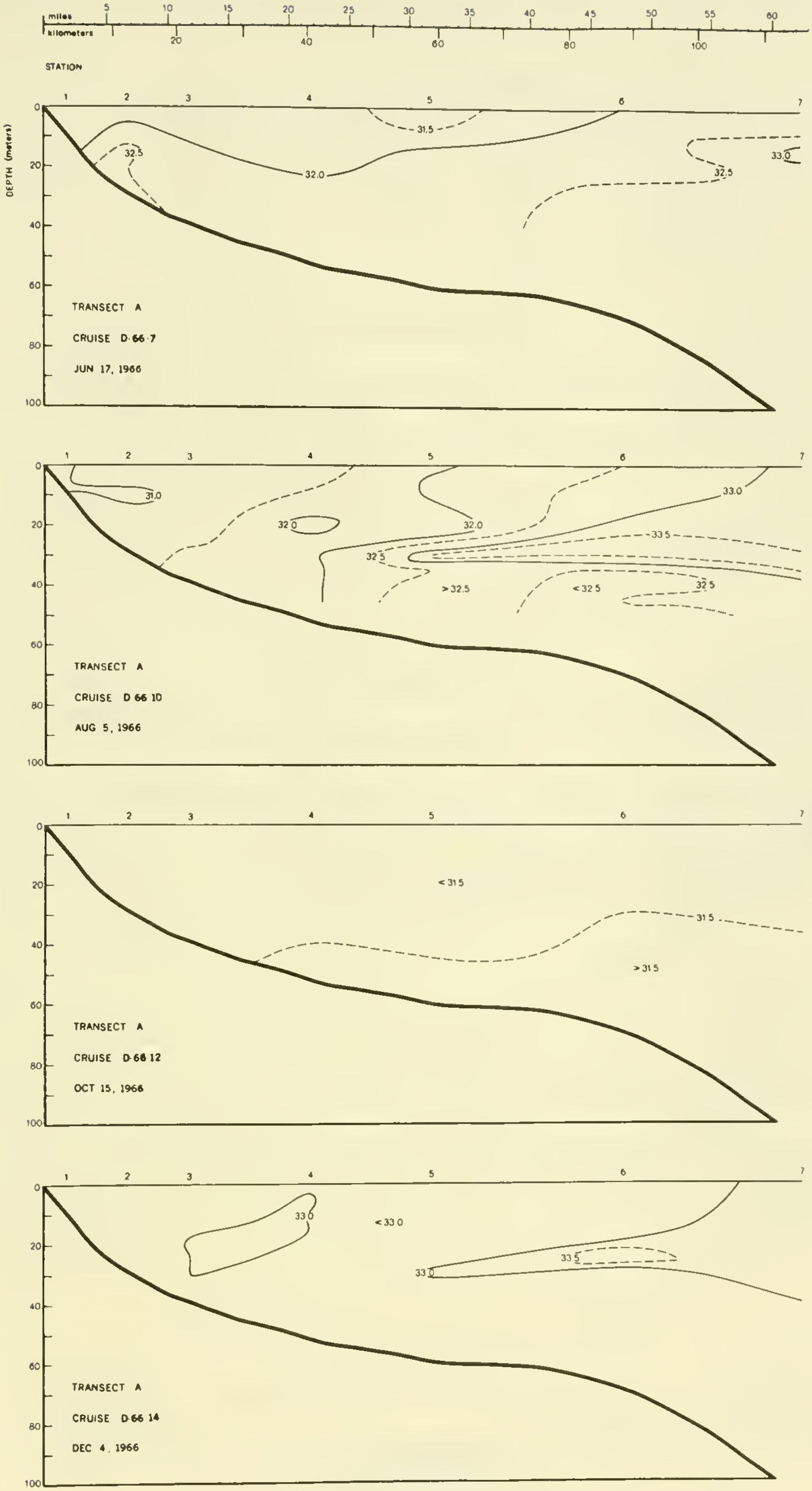
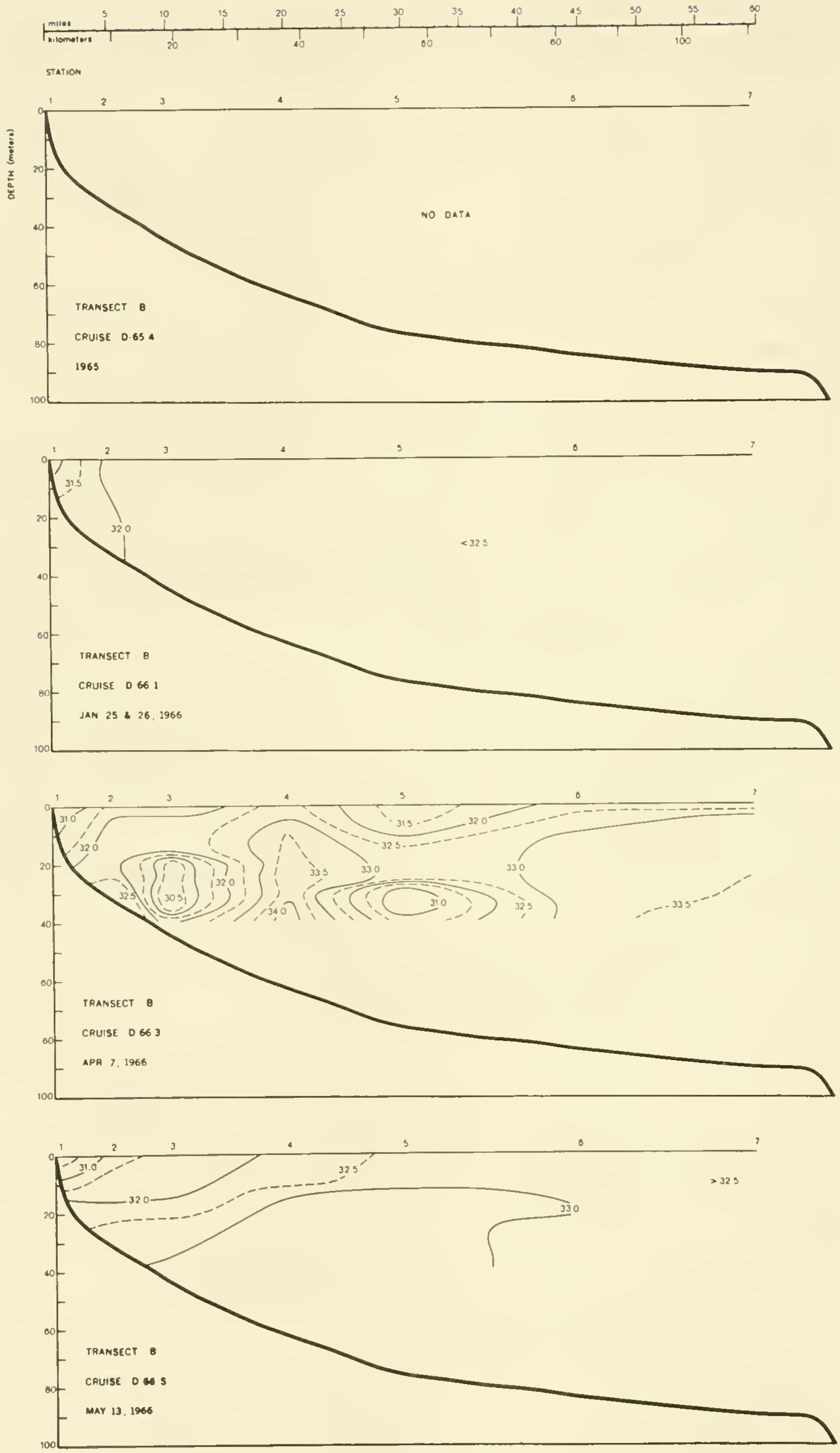

miles
5 10 15 20 25 30 35 40 45 50 55 60
kilometers
20 40 60 80 100
STATION
DEPTH (meters)
TRANSECT A
CRUISE D-66-7
JUN 17, 1966
TRANSECT A
CRUISE D 66 10
AUG 5, 1966
TRANSECT A
CRUISE D-66 12
OCT 15, 1966
TRANSECT A
CRUISE D-66 14
DEC 4, 1966

Figure E2



miles
kilometers
STATION
DEPTH (meters)
NO DATA
TRANSECT B
CRUISE D-65 4
1965
TRANSECT B
CRUISE D 66 1
JAN 25 & 26, 1966
TRANSECT B
CRUISE D 66 3
APR 7, 1966
TRANSECT B
CRUISE D 66 5
MAY 13, 1966

Figure E3

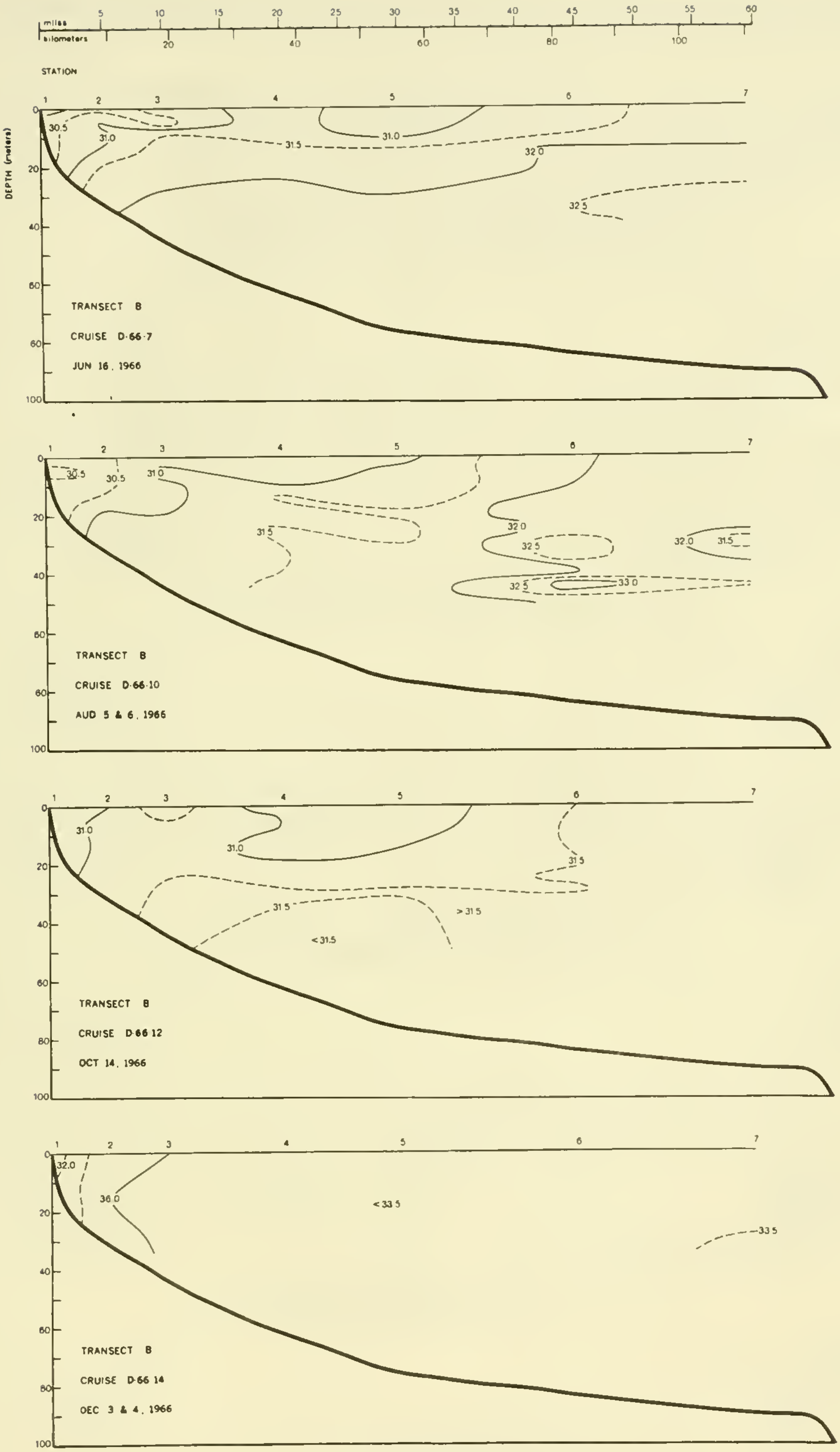

miles
kilometers
STATION
DEPTH (meters)
TRANSECT B
CRUISE D-66-7
JUN 16, 1966
TRANSECT B
CRUISE D-66-10
AUG 5 & 6, 1966
TRANSECT B
CRUISE D-66-12
OCT 14, 1966
TRANSECT B
CRUISE D-66-14
DEC 3 & 4, 1966

Figure E4

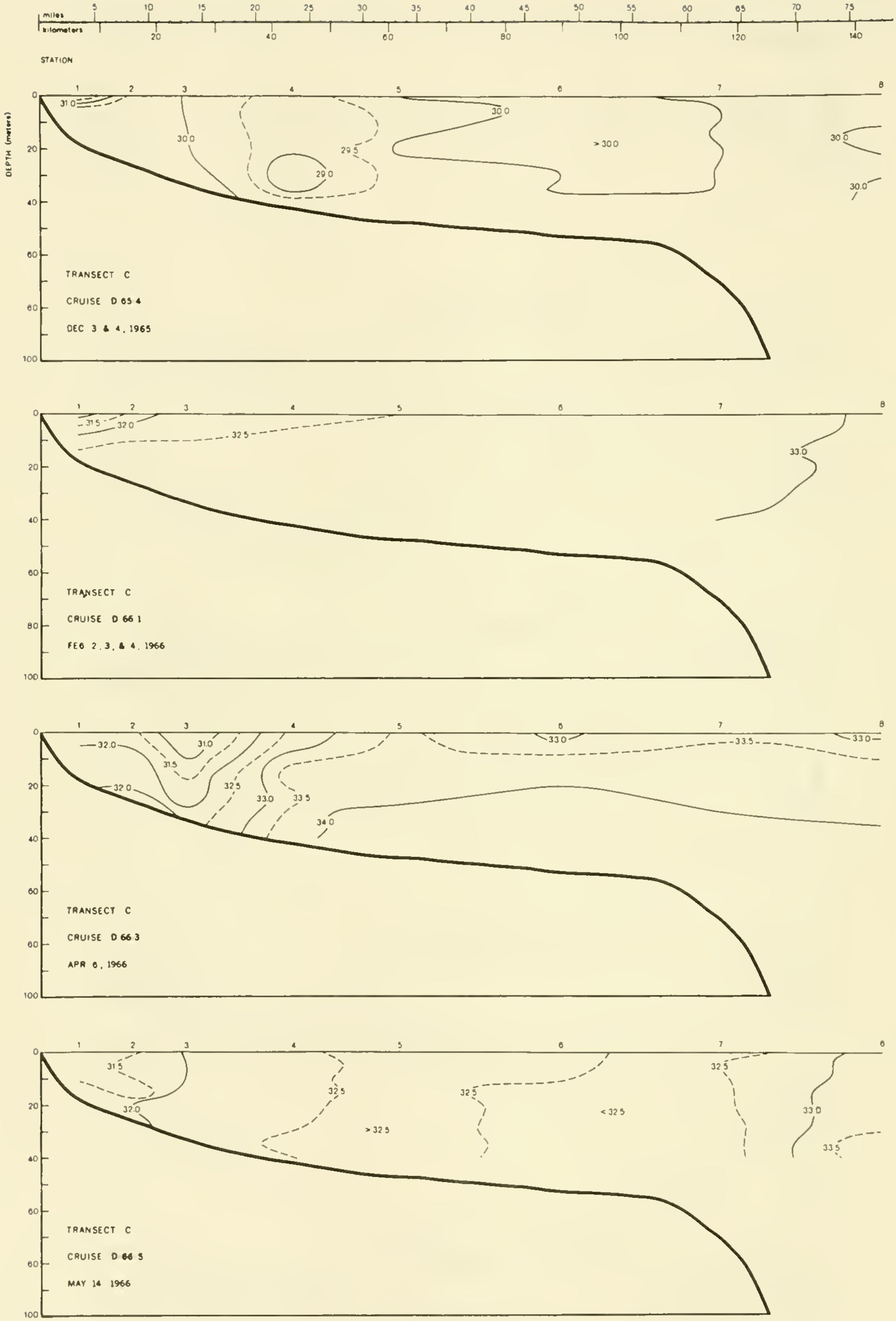

miles
kilometers
STATION
DEPTH (meters)
TRANSECT C
CRUISE D 65 4
DEC 3 & 4, 1965
TRANSECT C
CRUISE D 66 1
FEB 2, 3, & 4, 1966
TRANSECT C
CRUISE D 66 3
APR 6, 1966
TRANSECT C
CRUISE D 66 5
MAY 14 1966

Figure E5

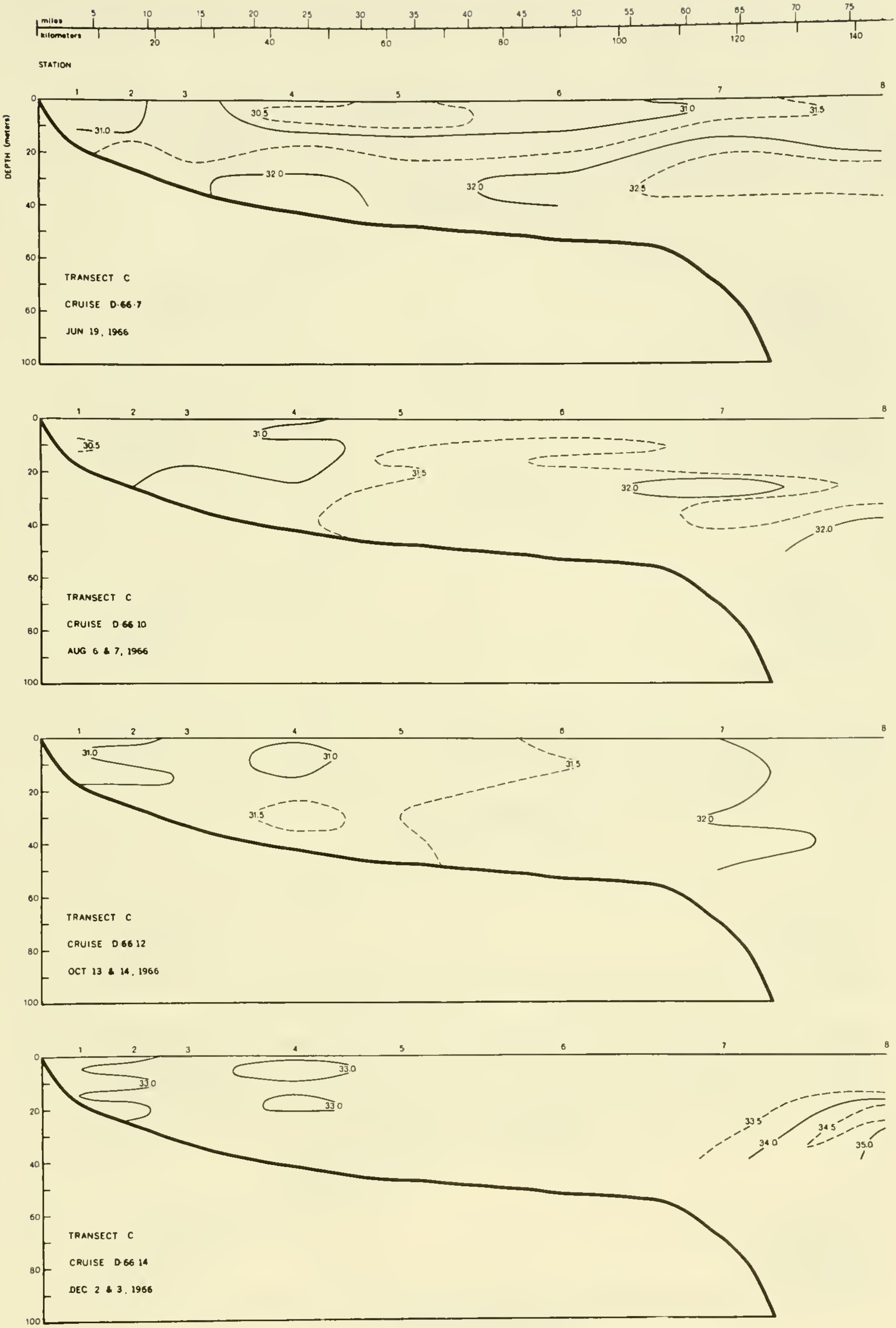

miles
kilometers
STATION
DEPTH (meters)
TRANSECT C
CRUISE D-66-7
JUN 19, 1966
TRANSECT C
CRUISE D 66 10
AUG 6 & 7, 1966
TRANSECT C
CRUISE D 66 12
OCT 13 & 14, 1966
TRANSECT C
CRUISE D-66 14
DEC 2 & 3, 1966

Figure E6

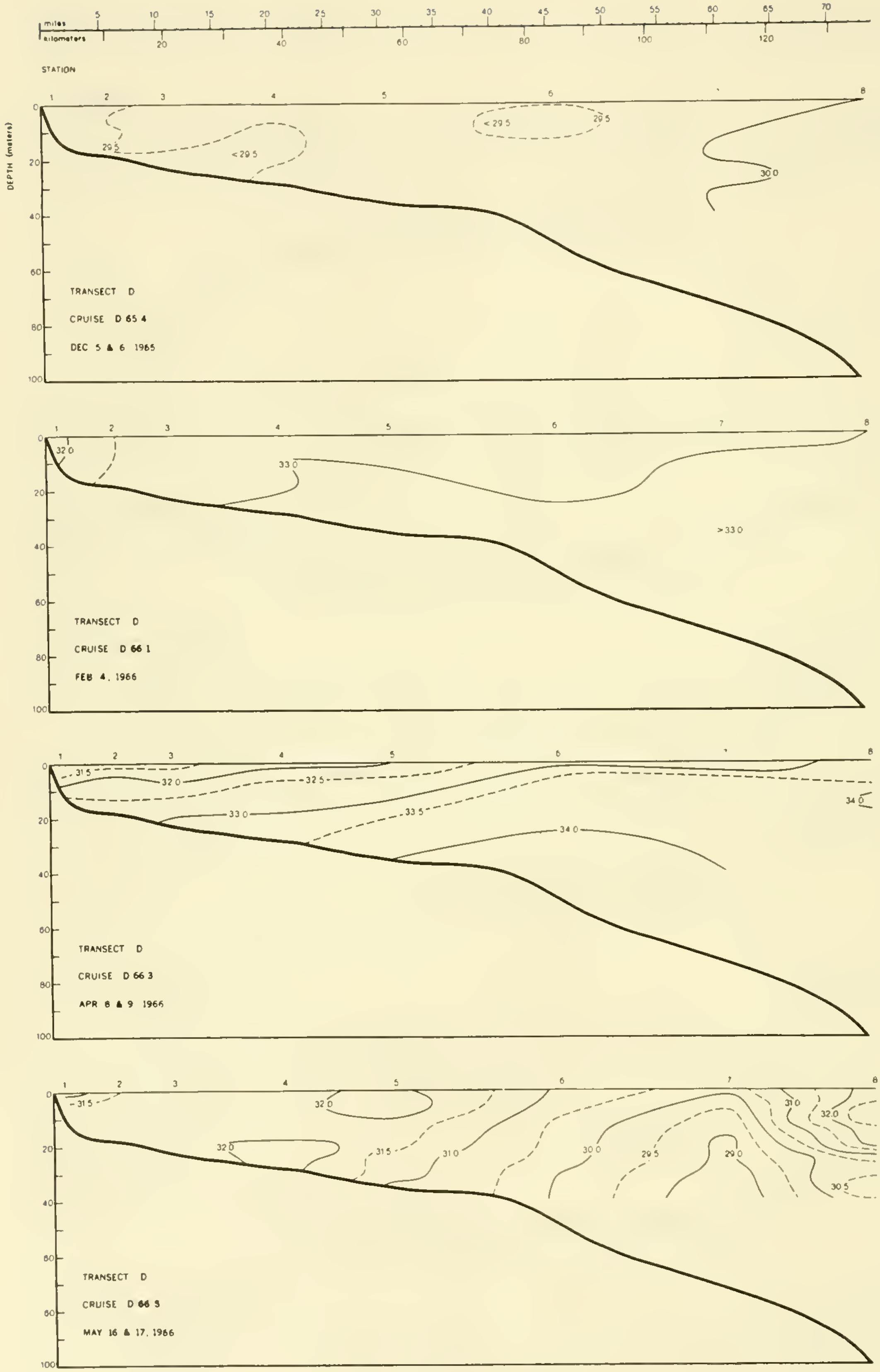

miles
kilometers
STATION
DEPTH (meters)
TRANSECT D
CRUISE D 65 4
DEC 5 & 6 1965
TRANSECT D
CRUISE D 66 1
FEB 4, 1966
TRANSECT D
CRUISE D 66 3
APR 8 & 9 1966
TRANSECT D
CRUISE D 66 5
MAY 16 & 17, 1966

Figure E7

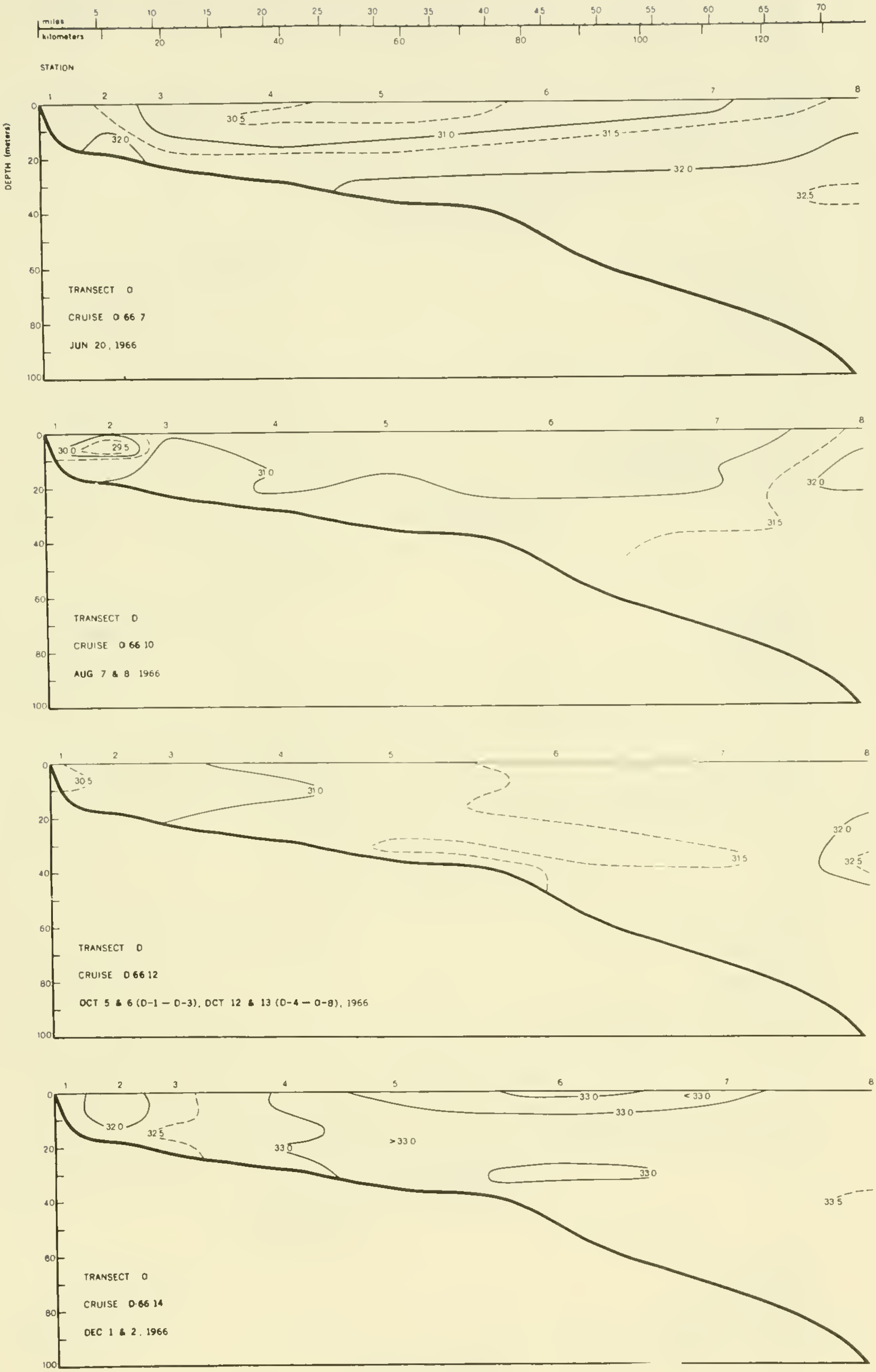

miles
kilometers
STATION
DEPTH (meters)
TRANSECT O
CRUISE O 66 7
JUN 20, 1966
TRANSECT O
CRUISE O 66 10
AUG 7 & 8 1966
TRANSECT O
CRUISE O 66 12
OCT 5 & 6 (O-1 — O-3), OCT 12 & 13 (O-4 — O-8), 1966
TRANSECT O
CRUISE O-66 14
DEC 1 & 2, 1966

Figure E8

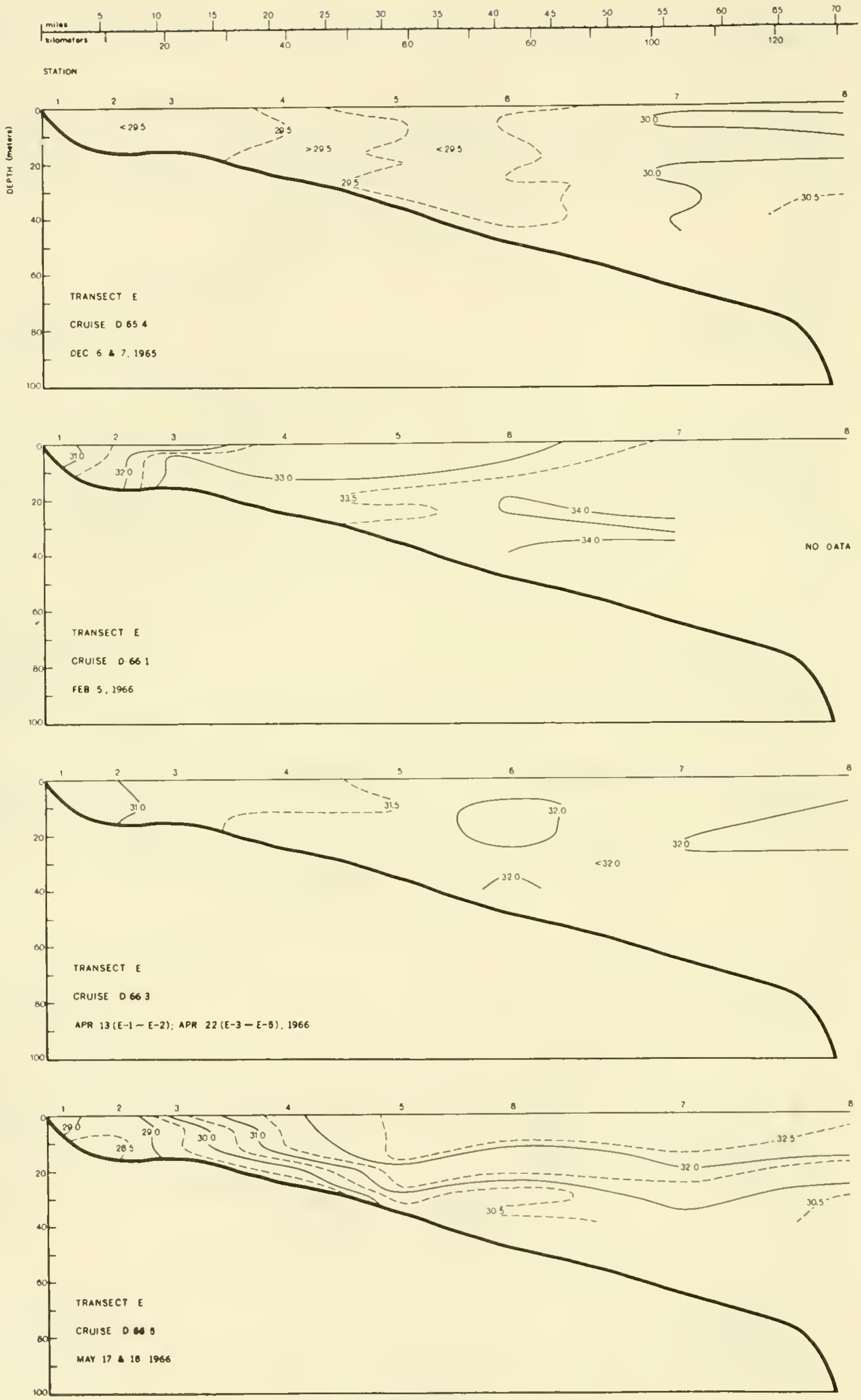

miles
kilometers
STATION
DEPTH (meters)
TRANSECT E
CRUISE D 65 4
DEC 6 & 7, 1965
TRANSECT E
CRUISE D 66 1
FEB 5, 1966
NO DATA
TRANSECT E
CRUISE D 66 3
APR 13 (E-1 — E-2); APR 22 (E-3 — E-5), 1966
TRANSECT E
CRUISE D 66 5
MAY 17 & 18 1966

Figure E9

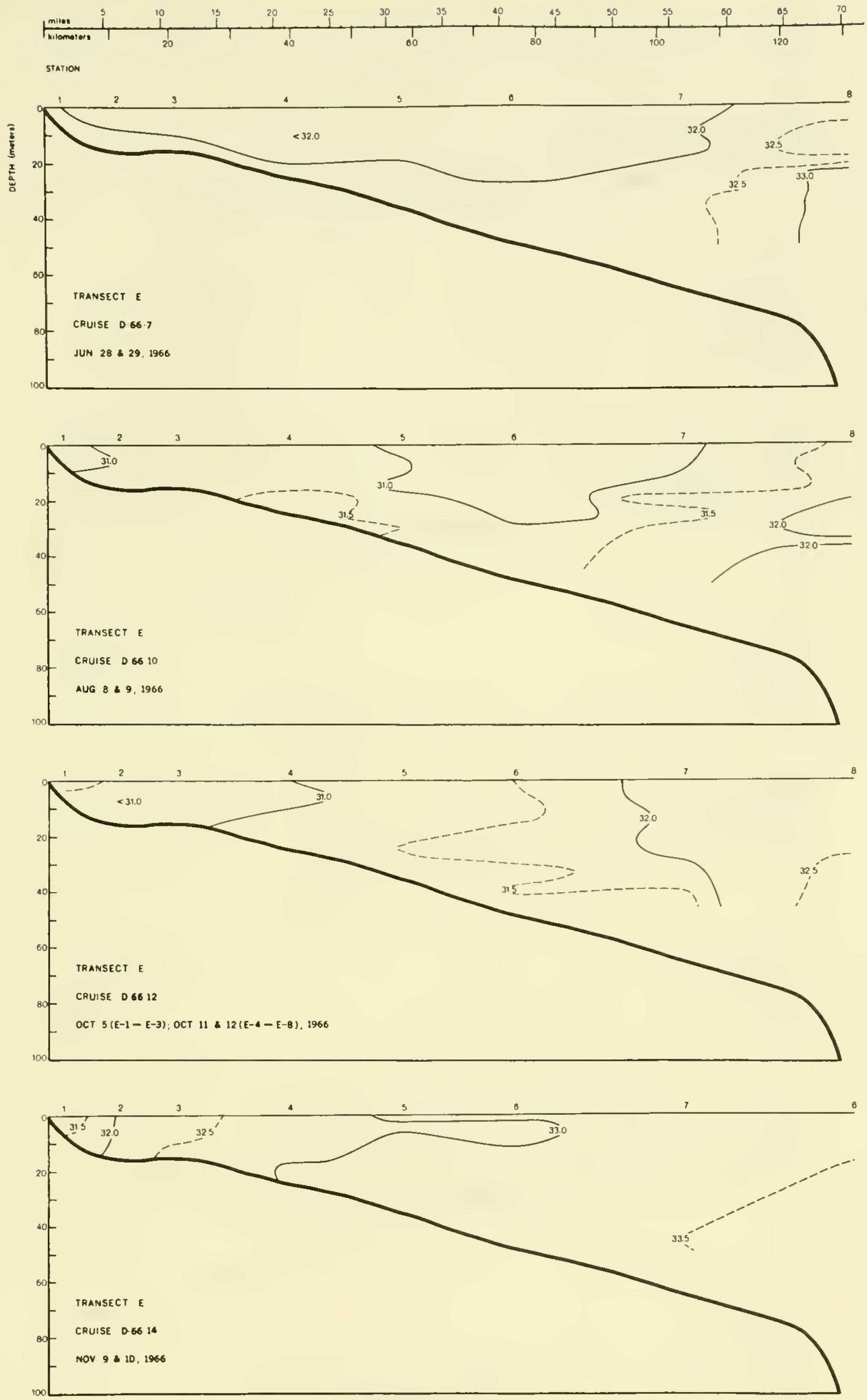

miles
kilometers
STATION
DEPTH (meters)
TRANSECT E
CRUISE D 66-7
JUN 28 & 29, 1966
TRANSECT E
CRUISE D 66 10
AUG 8 & 9, 1966
TRANSECT E
CRUISE D 66 12
OCT 5 (E-1 — E-3); OCT 11 & 12 (E-4 — E-8), 1966
TRANSECT E
CRUISE D-66 14
NOV 9 & 10, 1966

Figure E10

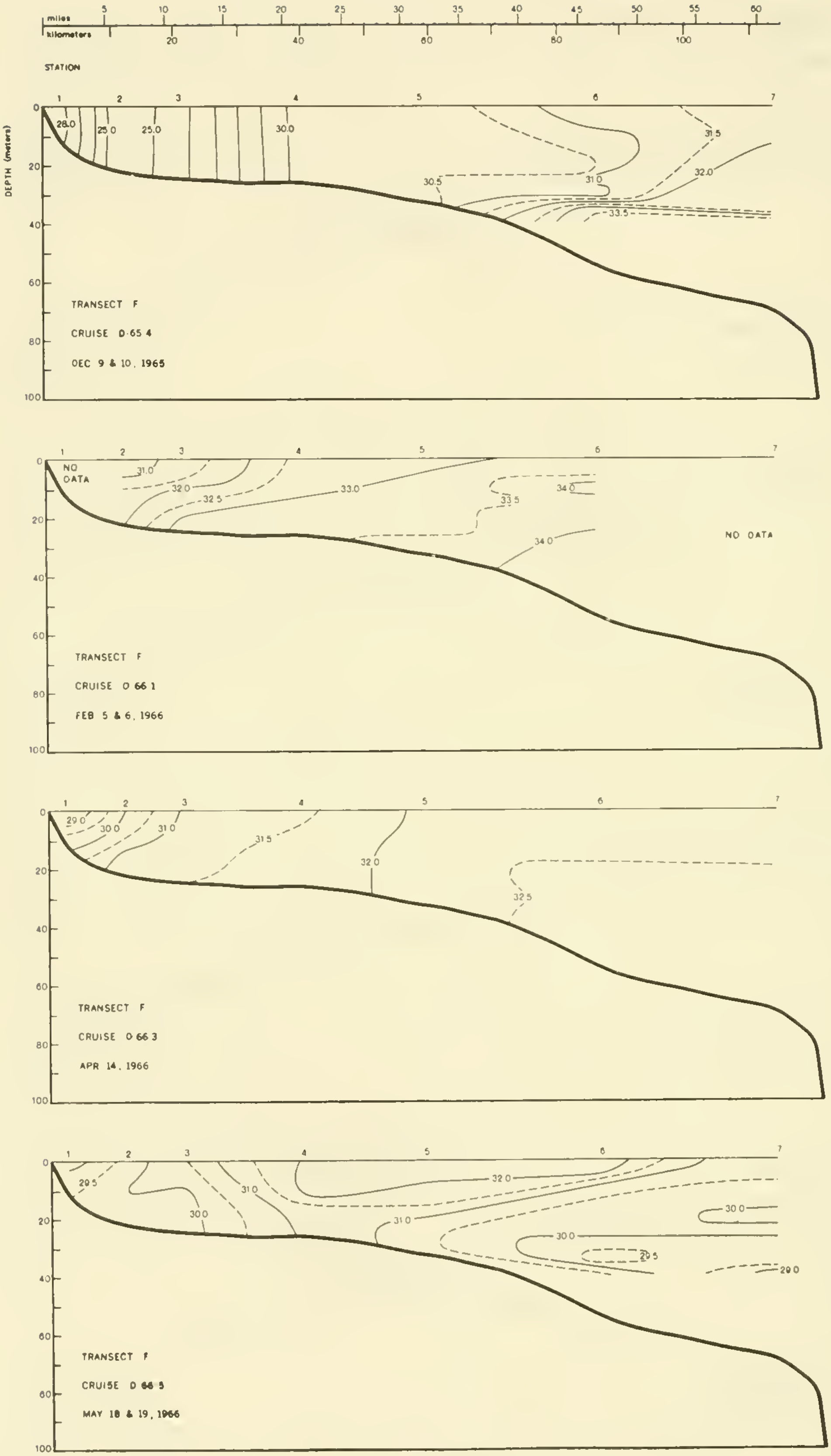
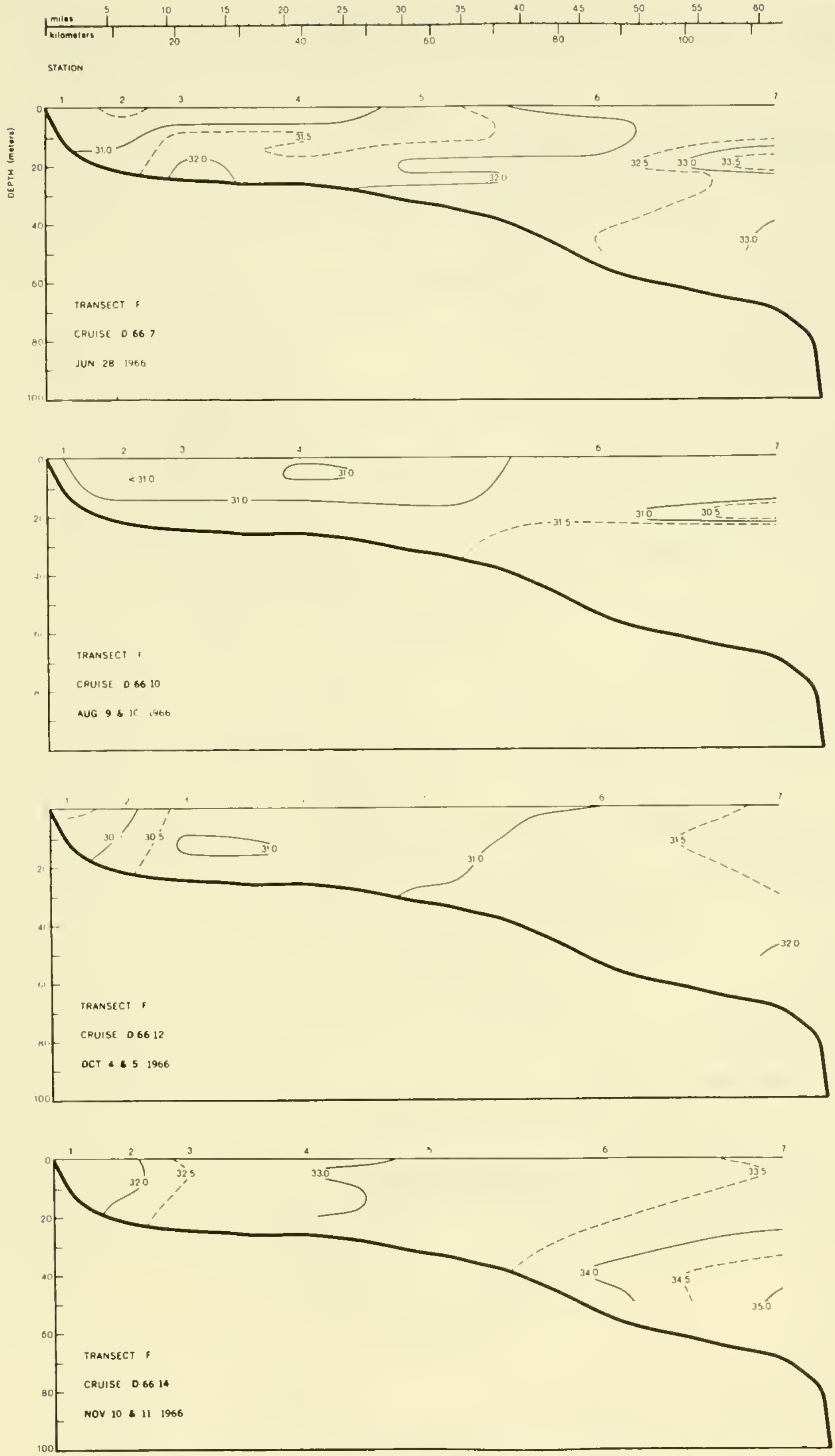

miles
kilometers
STATION
DEPTH (meters)
TRANSECT F
CRUISE D-65 4
DEC 9 & 10, 1965
NO DATA
TRANSECT F
CRUISE D 66 1
FEB 5 & 6, 1966
TRANSECT F
CRUISE D 66 3
APR 14, 1966
TRANSECT F
CRUISE D 66 5
MAY 18 & 19, 1966

Figure E11



miles
kilometers
STATION
DEPTH (meters)
TRANSECT F
CRUISE D 66 7
JUN 28 1966
TRANSECT F
CRUISE D 66 10
AUG 9 & 10 1966
TRANSECT F
CRUISE D 66 12
OCT 4 & 5 1966
TRANSECT F
CRUISE D 66 14
NOV 10 & 11 1966

Figure E12

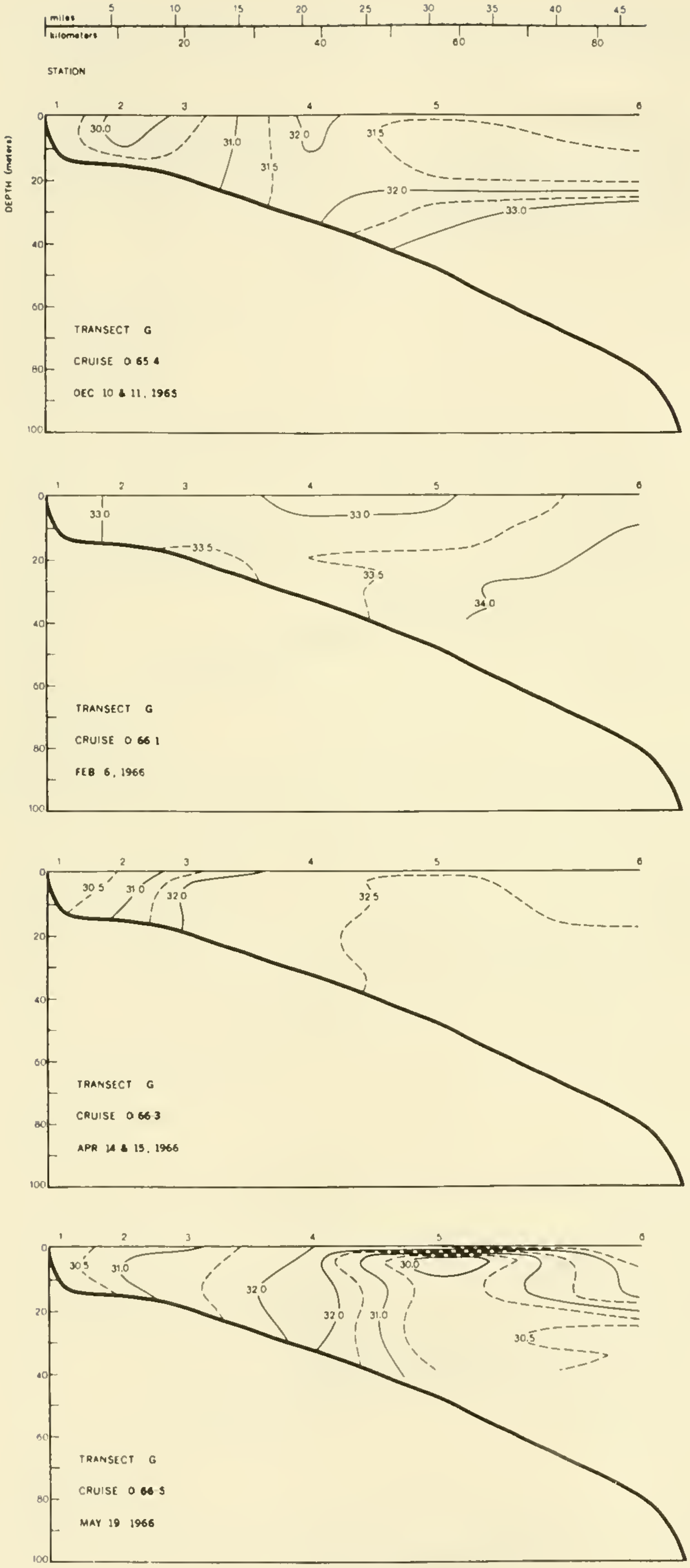

miles
kilometers
STATION
DEPTH (meters)
TRANSECT G
CRUISE O 65 4
DEC 10 & 11, 1965
TRANSECT G
CRUISE O 66 1
FEB 6, 1966
TRANSECT G
CRUISE O 66 3
APR 14 & 15, 1966
TRANSECT G
CRUISE O 66 5
MAY 19 1966

Figure E13

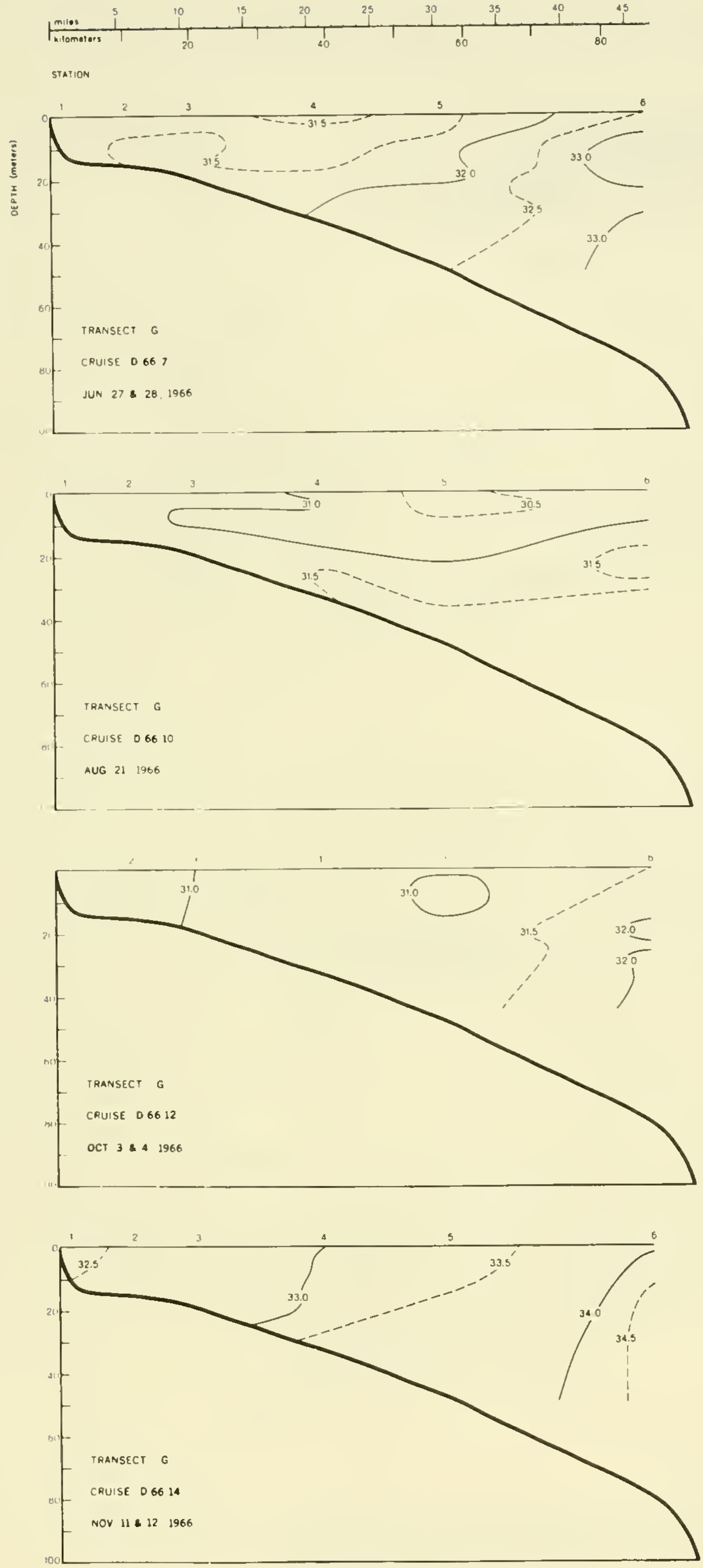

miles
kilometers
STATION
DEPTH (meters)
TRANSECT G
CRUISE D 66 7
JUN 27 & 28, 1966
TRANSECT G
CRUISE D 66 10
AUG 21 1966
TRANSECT G
CRUISE D 66 12
OCT 3 & 4 1966
TRANSECT G
CRUISE D 66 14
NOV 11 & 12 1966

Figure E14

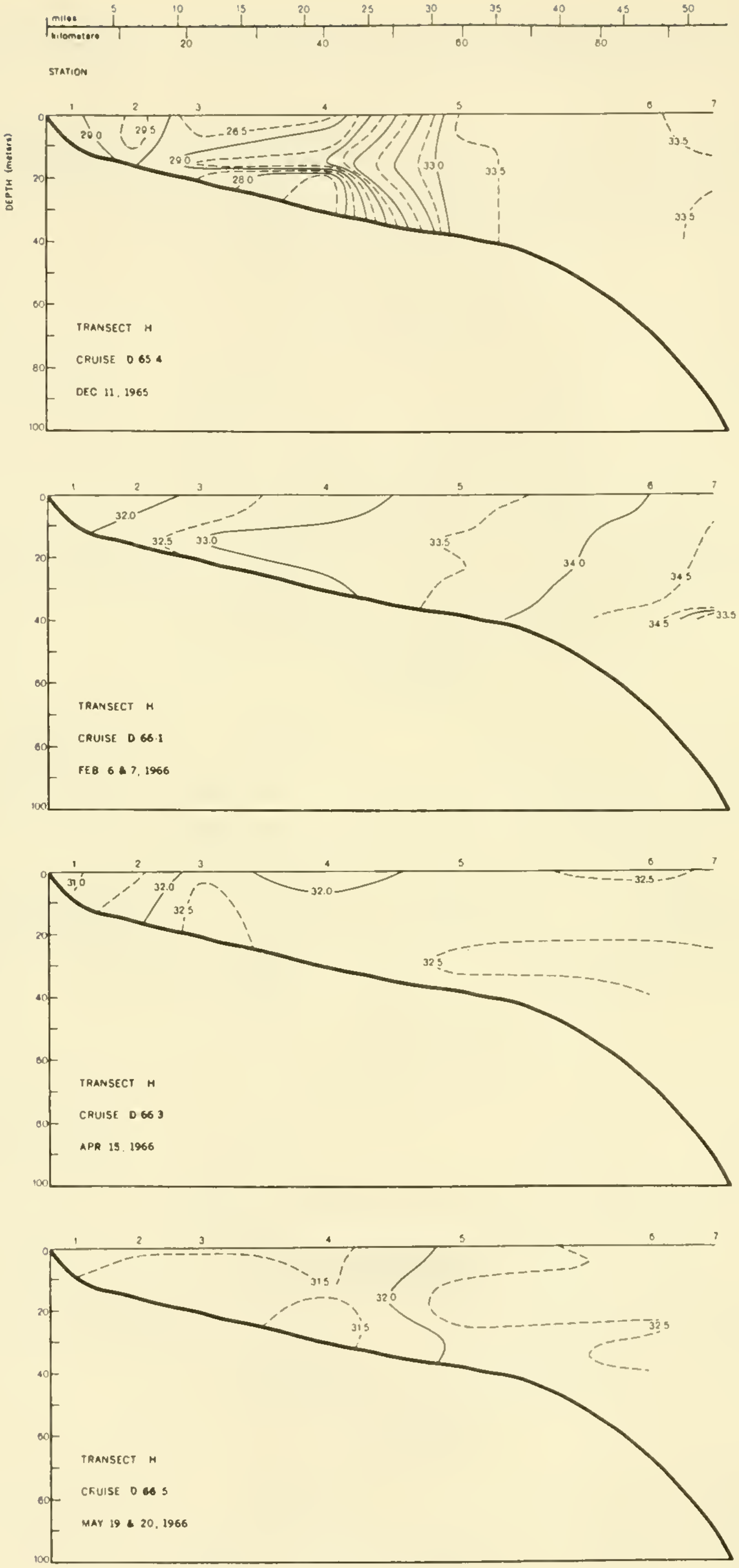
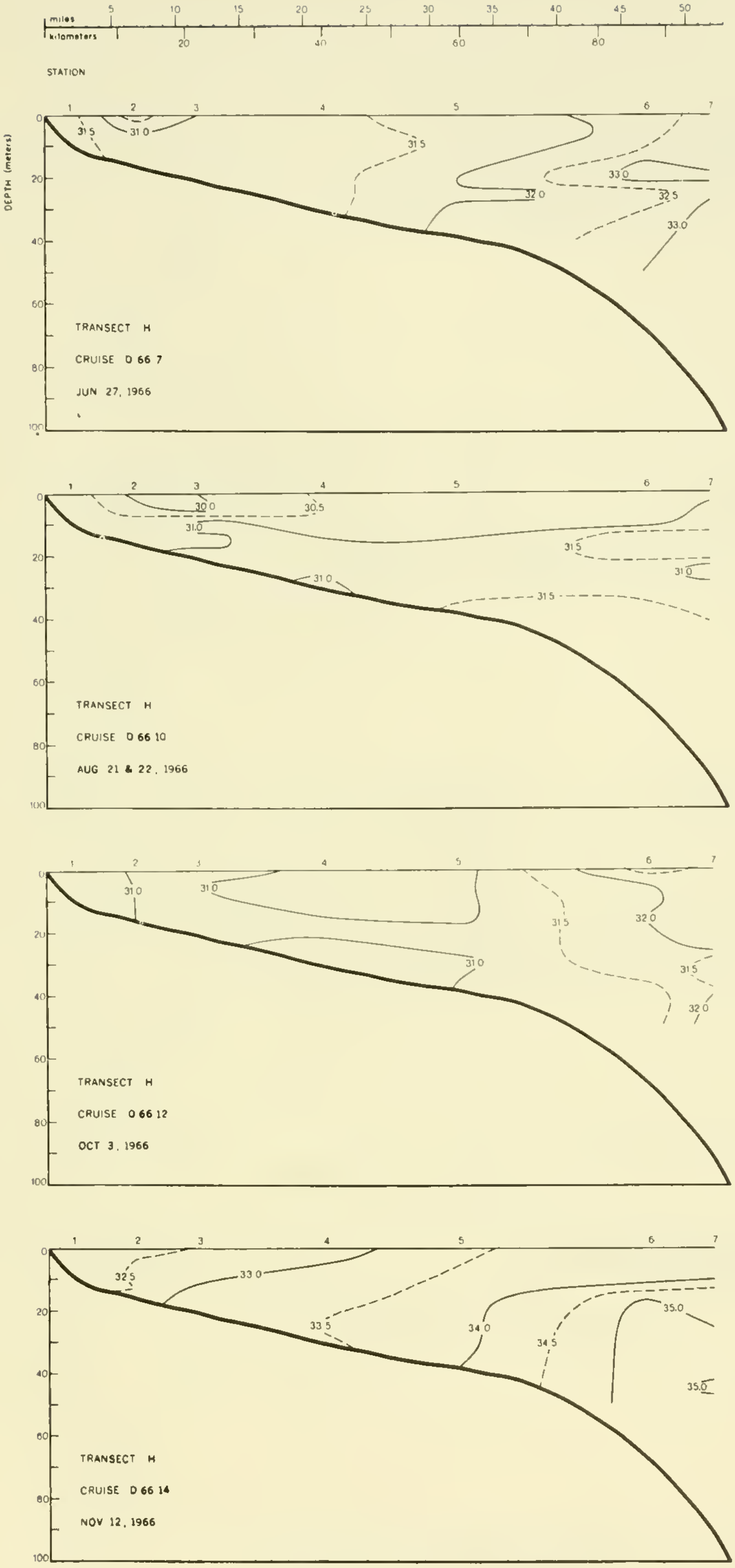
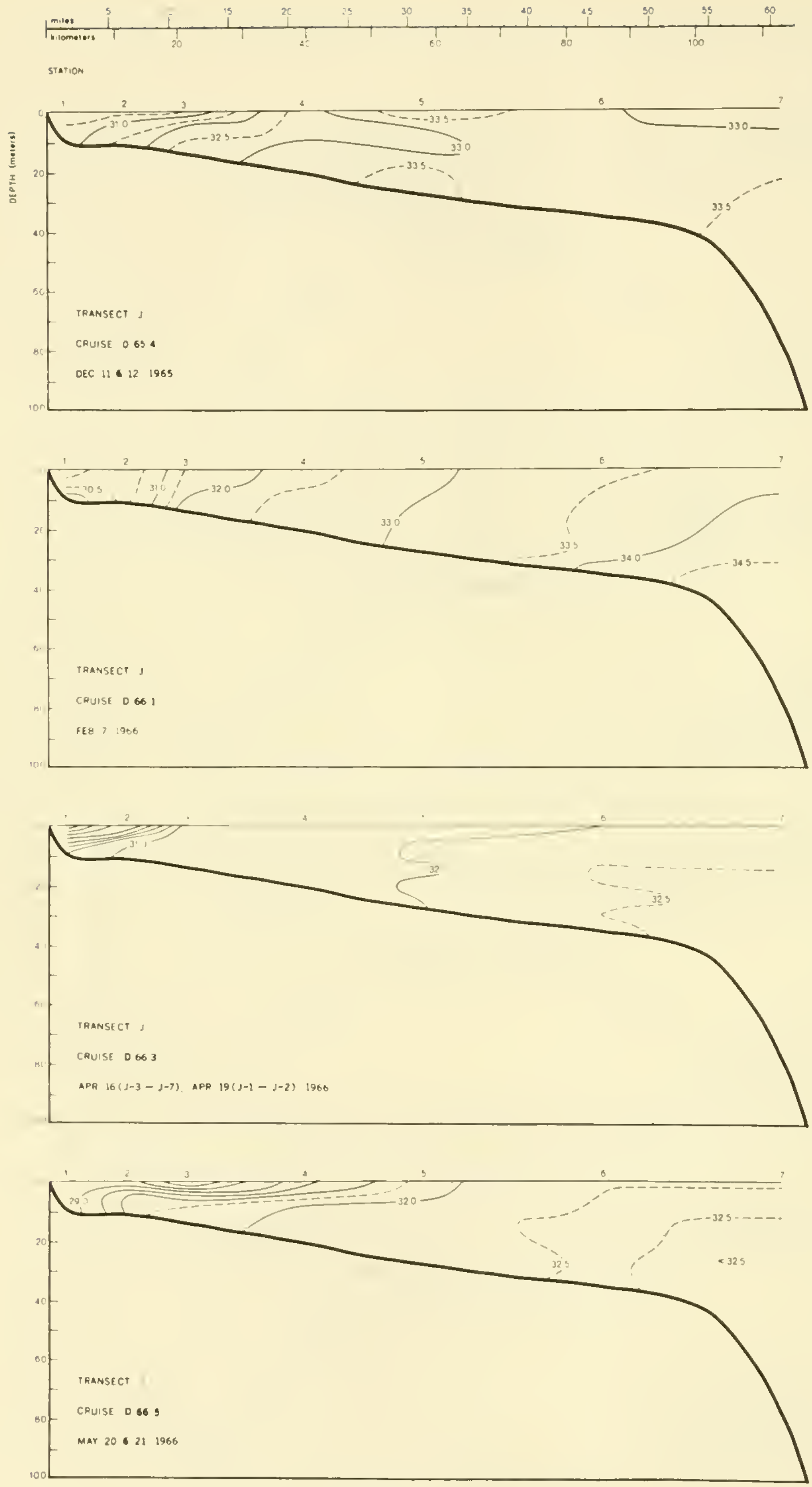

miles
kilometers
5
10
15
20
25
30
35
40
45
50
20
40
60
80
STATION
DEPTH (meters)
TRANSECT H
CRUISE D 65 4
DEC 11, 1965
TRANSECT H
CRUISE D 66·1
FEB 6 & 7, 1966
TRANSECT H
CRUISE D 66 3
APR 15, 1966
TRANSECT H
CRUISE D 66 5
MAY 19 & 20, 1966

Figure E15


miles
kilometers
STATION
DEPTH (meters)
TRANSECT H
CRUISE 0 66 7
JUN 27, 1966
TRANSECT H
CRUISE 0 66 10
AUG 21 & 22, 1966
TRANSECT H
CRUISE 0 66 12
OCT 3, 1966
TRANSECT H
CRUISE 0 66 14
NOV 12, 1966
Figure E16



miles
kilometers
STATION
DEPTH (meters)
TRANSECT J
CRUISE D 65 4
DEC 11 & 12 1965
TRANSECT J
CRUISE D 66 1
FEB 7 1966
TRANSECT J
CRUISE D 66 3
APR 16 (J-3 — J-7), APR 19 (J-1 — J-2) 1966
TRANSECT
CRUISE D 66 5
MAY 20 & 21 1966

Figure E17

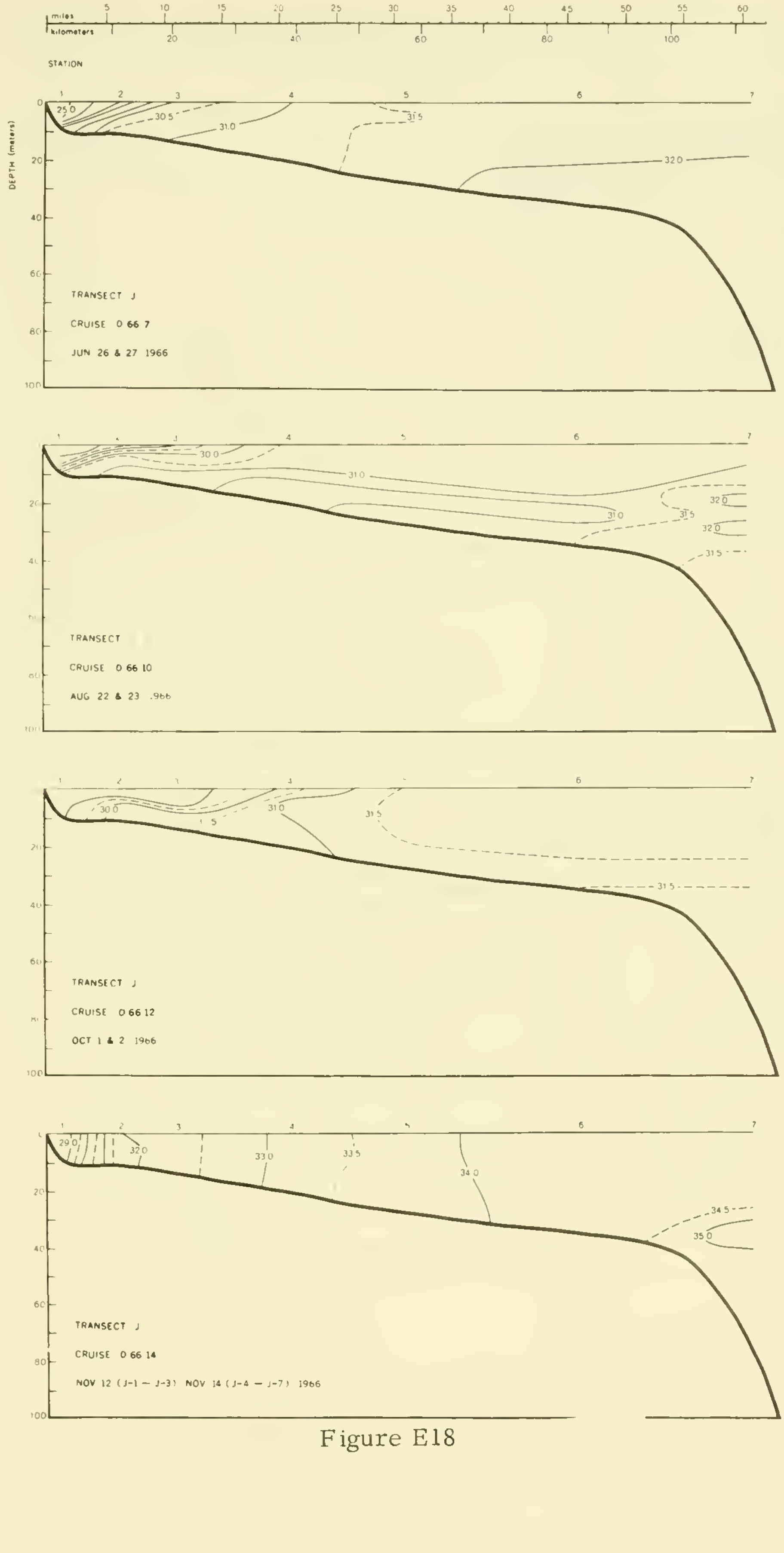

miles
kilometers
STATION
DEPTH (meters)
TRANSECT J
CRUISE 0 66 7
JUN 26 & 27 1966
TRANSECT
CRUISE 0 66 10
AUG 22 & 23
TRANSECT J
CRUISE 0 66 12
OCT 1 & 2 1966
TRANSECT J
CRUISE 0 66 14
NOV 12 (J-1 — J-3) NOV 14 (J-4 — J-7) 1966

Figure E18

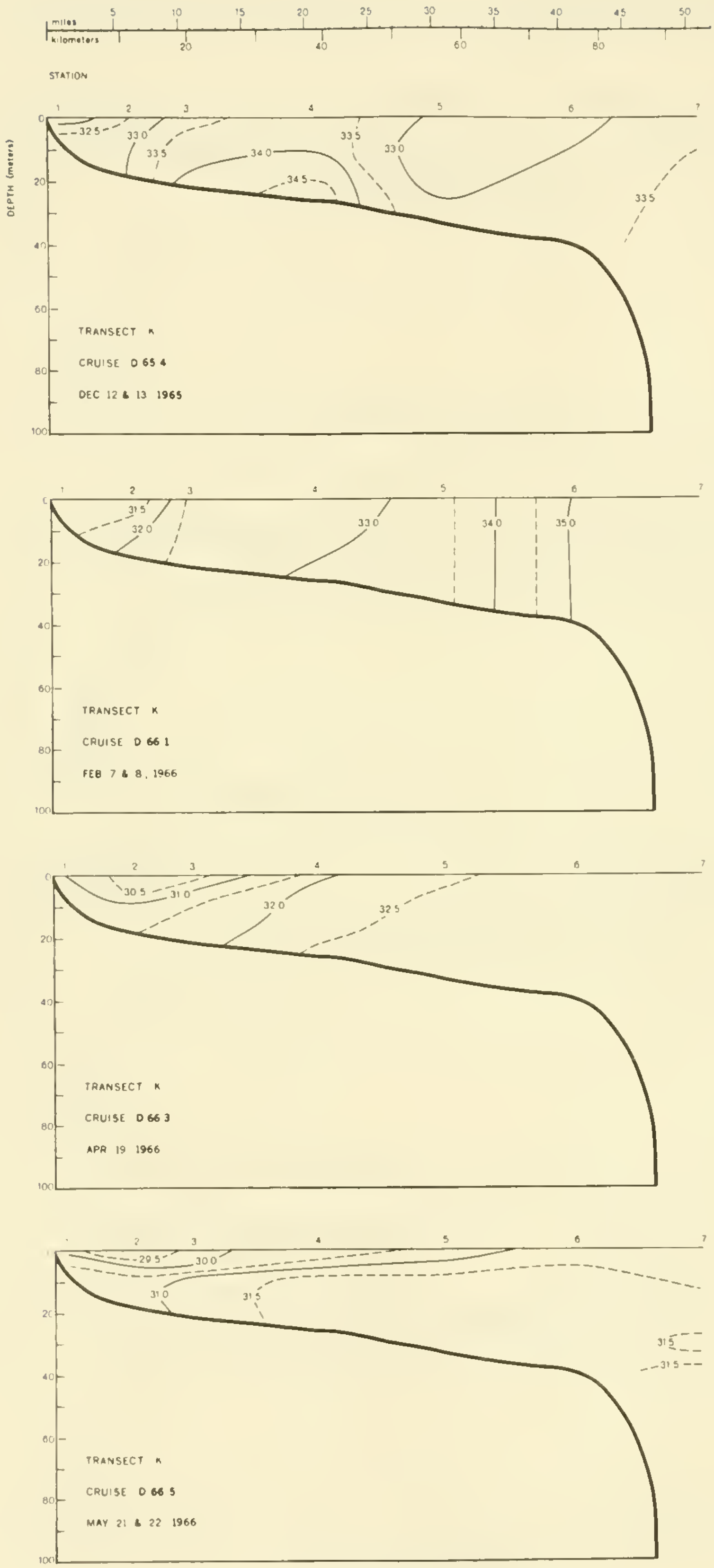

miles
kilometers
STATION
DEPTH (meters)
TRANSECT K
CRUISE D 65 4
DEC 12 & 13 1965
TRANSECT K
CRUISE D 66 1
FEB 7 & 8, 1966
TRANSECT K
CRUISE D 66 3
APR 19 1966
TRANSECT K
CRUISE D 66 5
MAY 21 & 22 1966

Figure E19

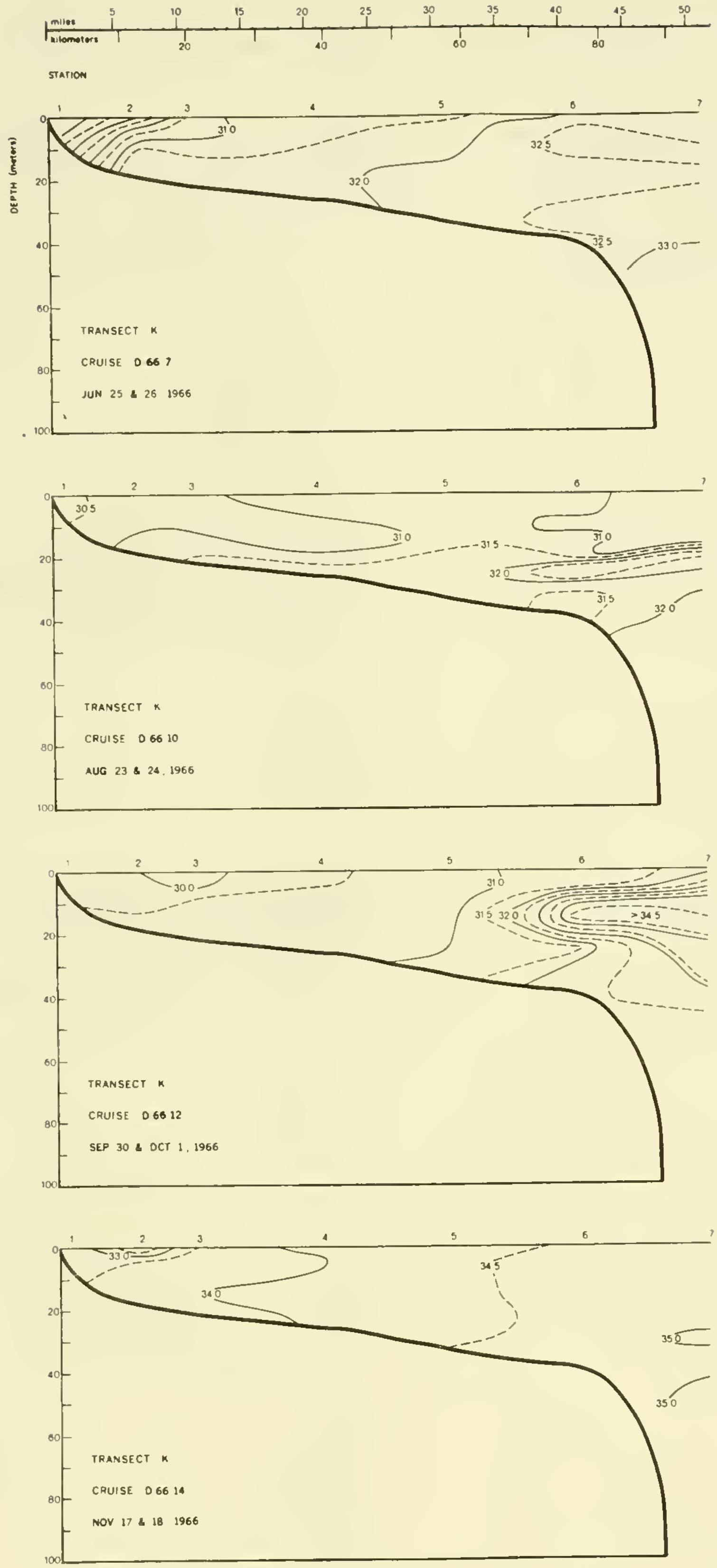

miles
kilometers
STATION
DEPTH (meters)
TRANSECT K
CRUISE D 66 7
JUN 25 & 26 1966
TRANSECT K
CRUISE D 66 10
AUG 23 & 24, 1966
TRANSECT K
CRUISE D 66 12
SEP 30 & OCT 1, 1966
TRANSECT K
CRUISE D 66 14
NOV 17 & 18 1966

Figure E20

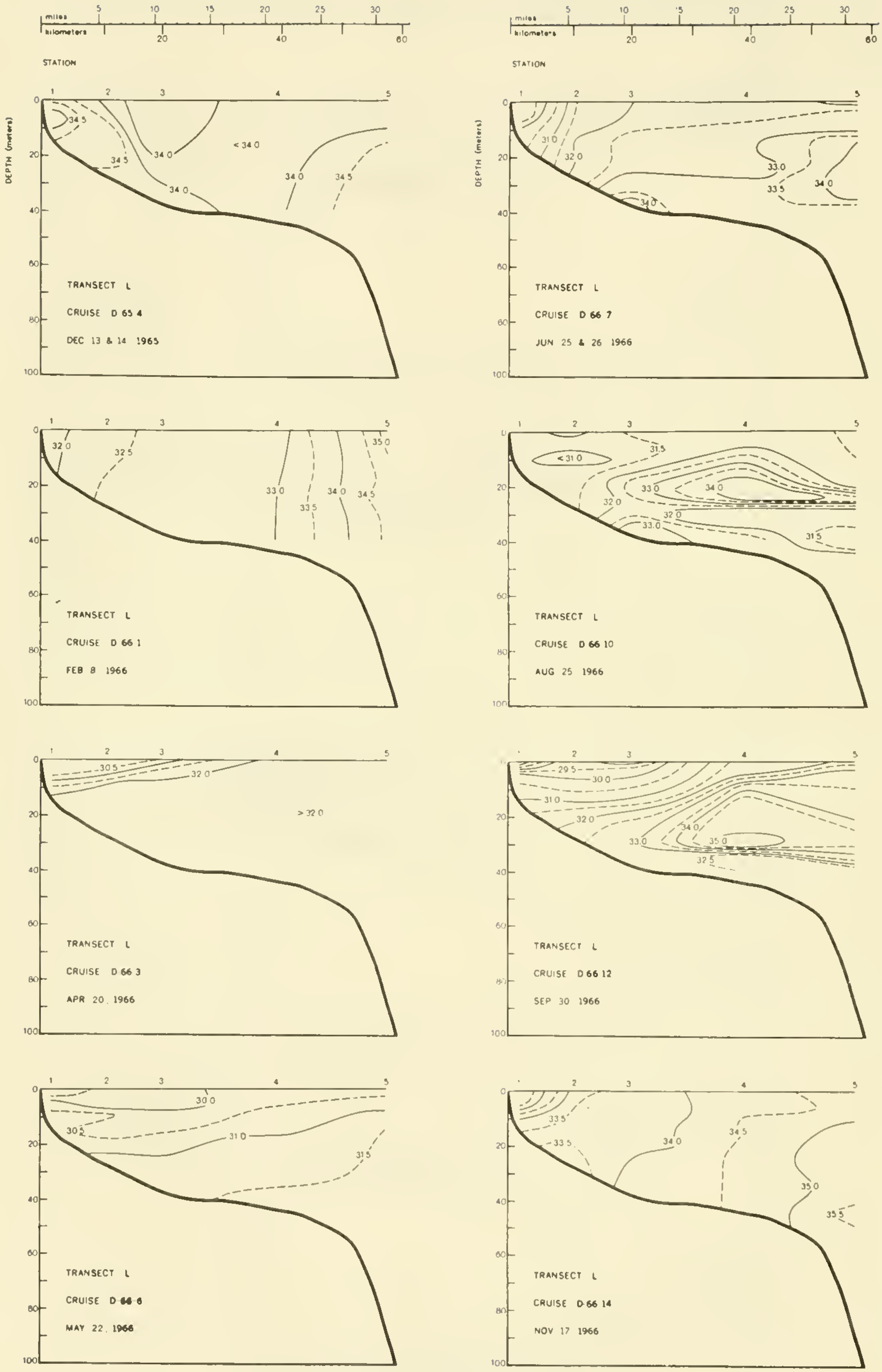
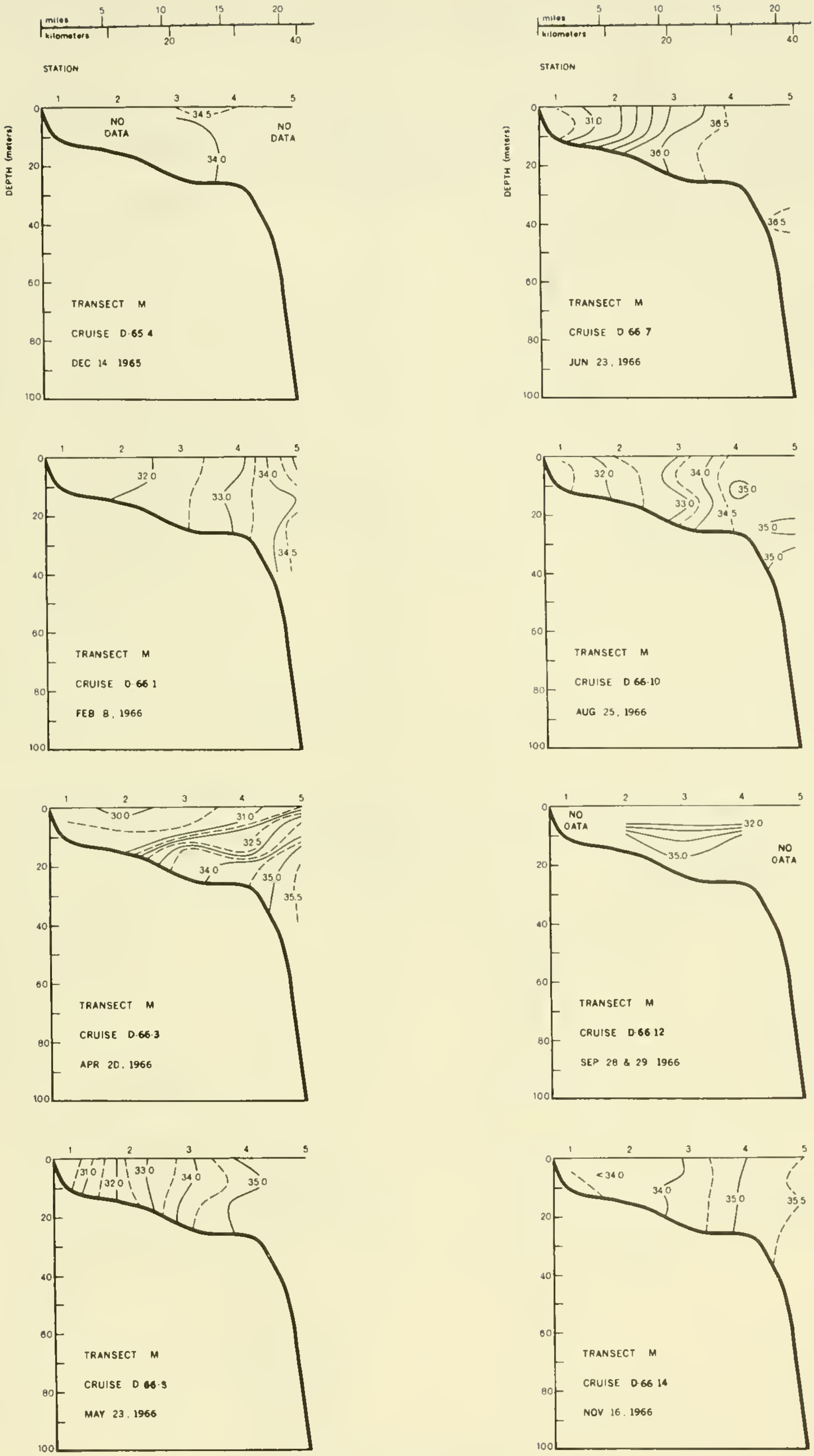
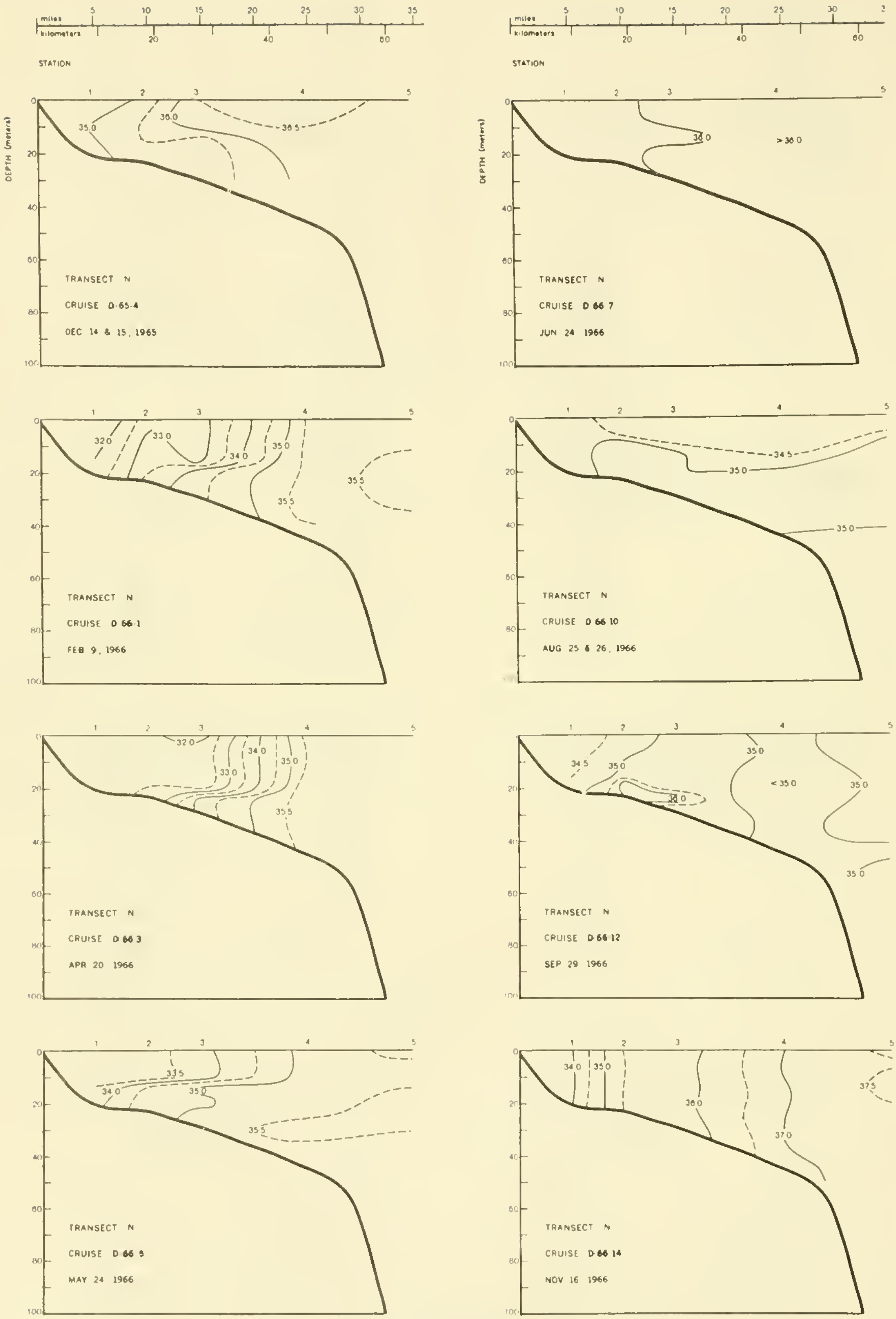

miles
kilometers
STATION
DEPTH (meters)
TRANSECT L
CRUISE D 65 4
DEC 13 & 14 1965
TRANSECT L
CRUISE D 66 7
JUN 25 & 26 1966
TRANSECT L
CRUISE D 66 1
FEB 8 1966
TRANSECT L
CRUISE D 66 10
AUG 25 1966
TRANSECT L
CRUISE D 66 3
APR 20, 1966
TRANSECT L
CRUISE D 66 12
SEP 30 1966
TRANSECT L
CRUISE D 66 6
MAY 22, 1966
TRANSECT L
CRUISE D 66 14
NOV 17 1966

Figure E21



miles
5
10
15
20
kilometers
20
40
STATION
DEPTH (meters)
NO DATA
34.5
34.0
NO DATA
TRANSECT M
CRUISE D-65-4
DEC 14 1965
31.0
36.5
36.0
36.5
TRANSECT M
CRUISE D-66-7
JUN 23, 1966
32.0
33.0
34.0
34.5
TRANSECT M
CRUISE D-66-1
FEB 8, 1966
32.0
34.0
33.0
35.0
34.5
35.0
35.0
TRANSECT M
CRUISE D-66-10
AUG 25, 1966
30.0
31.0
32.5
34.0
35.0
35.5
TRANSECT M
CRUISE D-66-3
APR 20, 1966
NO DATA
32.0
35.0
NO DATA
TRANSECT M
CRUISE D-66-12
SEP 28 & 29 1966
31.0
32.0
33.0
34.0
35.0
TRANSECT M
CRUISE D-66-5
MAY 23, 1966
<34.0
34.0
35.0
35.5
TRANSECT M
CRUISE D-66-14
NOV 16, 1966

Figure E22



miles
kilometers
STATION
DEPTH (meters)
TRANSECT N
CRUISE D-65-4
DEC 14 & 15, 1965
TRANSECT N
CRUISE D 66 7
JUN 24 1966
TRANSECT N
CRUISE D 66-1
FEB 9, 1966
TRANSECT N
CRUISE D 66 10
AUG 25 & 26, 1966
TRANSECT N
CRUISE D 66 3
APR 20 1966
TRANSECT N
CRUISE D-66 12
SEP 29 1966
TRANSECT N
CRUISE D 66 5
MAY 24 1966
TRANSECT N
CRUISE D-66 14
NOV 16 1966

Figure E23

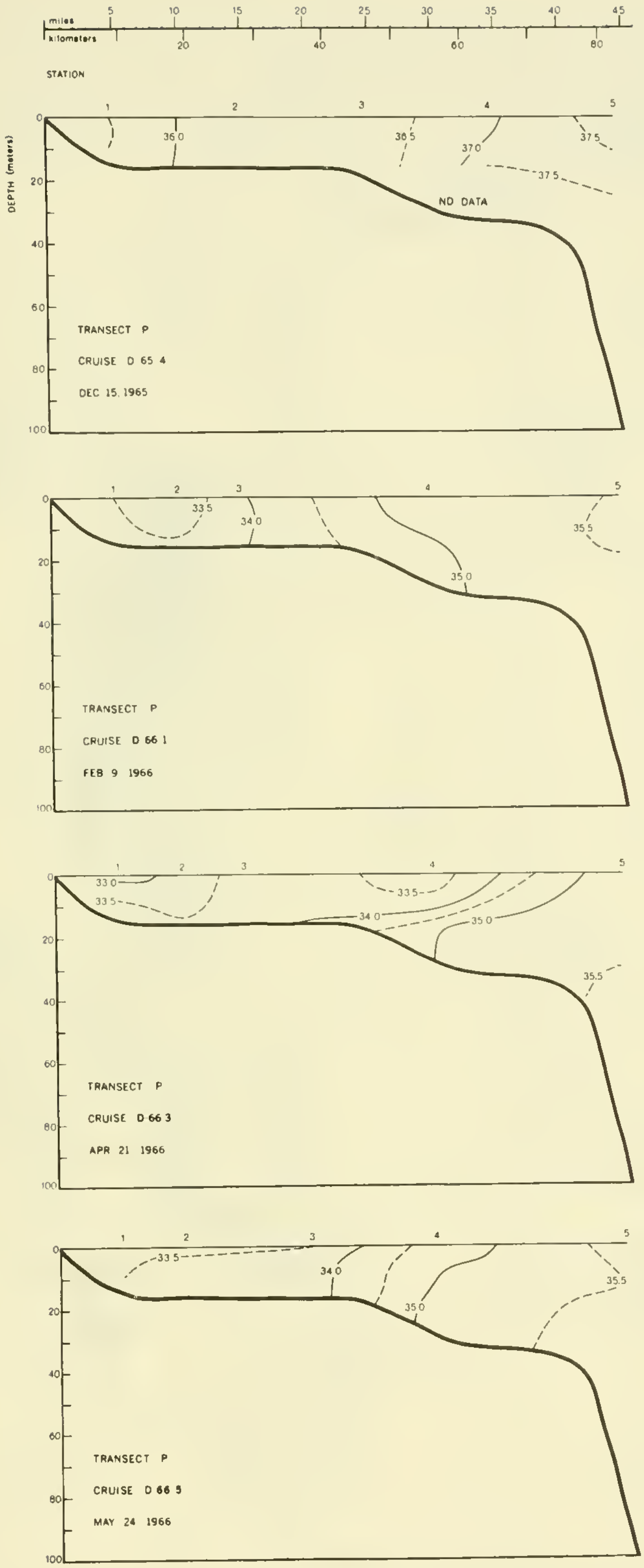

miles
kilometers
STATION
DEPTH (meters)
TRANSECT P
CRUISE D 65 4
DEC 15, 1965
NO DATA
TRANSECT P
CRUISE D 66 1
FEB 9 1966
TRANSECT P
CRUISE D 66 3
APR 21 1966
TRANSECT P
CRUISE D 66 5
MAY 24 1966

Figure E24

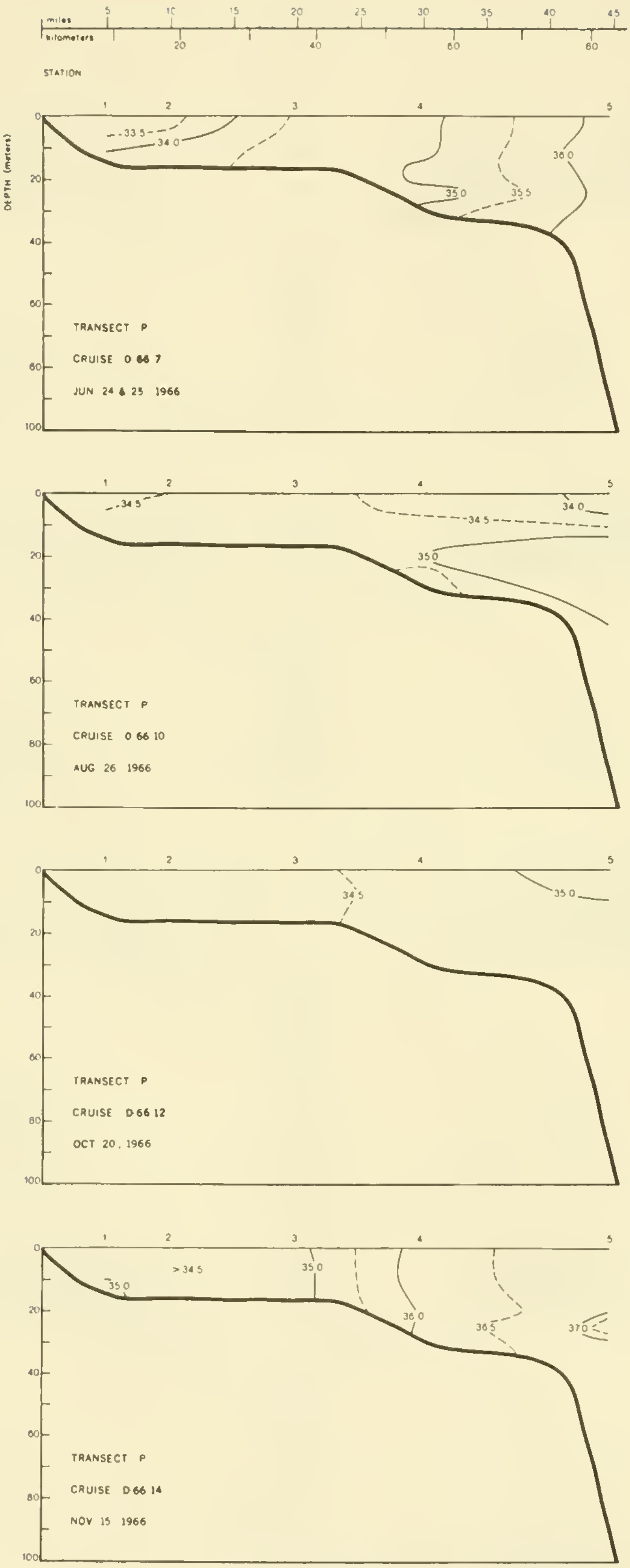

miles
5
10
15
20
25
30
35
40
45
kilometers
20
40
60
80
STATION
DEPTH (meters)
TRANSECT P
CRUISE O 66 7
JUN 24 & 25 1966
TRANSECT P
CRUISE O 66 10
AUG 26 1966
TRANSECT P
CRUISE D 66 12
OCT 20, 1966
TRANSECT P
CRUISE D 66 14
NOV 15 1966

Figure E25

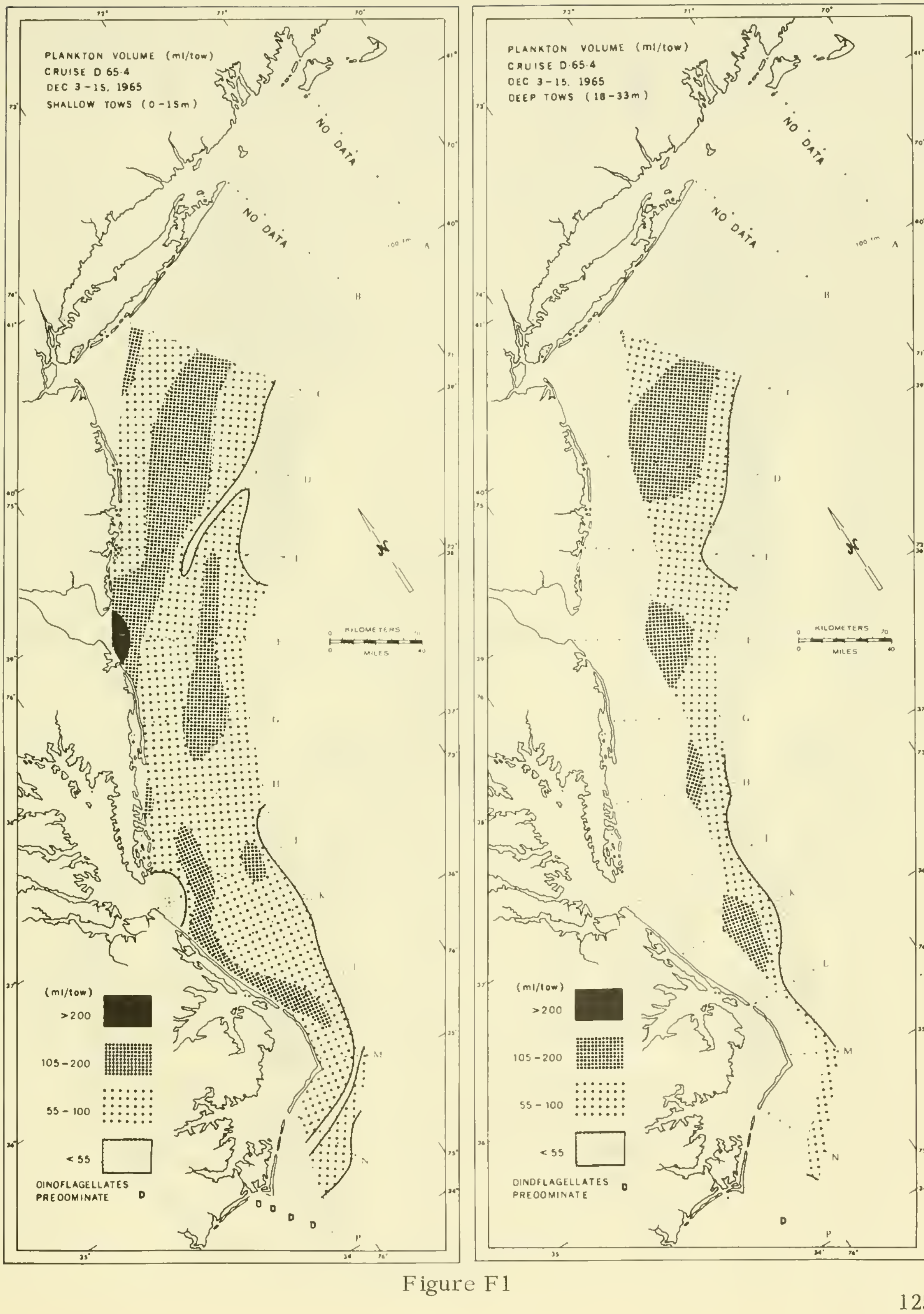

PLANKTON VOLUME (ml/tow)
CRUISE D 65-4
DEC 3-15, 1965
SHALLOW TOWS (0-15m)
NO DATA
NO DATA
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55
DINOFLAGELLATES PREDOMINATE D
PLANKTON VOLUME (ml/tow)
CRUISE D 65-4
DEC 3-15, 1965
DEEP TOWS (18-33m)
NO DATA
NO DATA
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55
DINOFLAGELLATES PREDOMINATE D

Figure F1

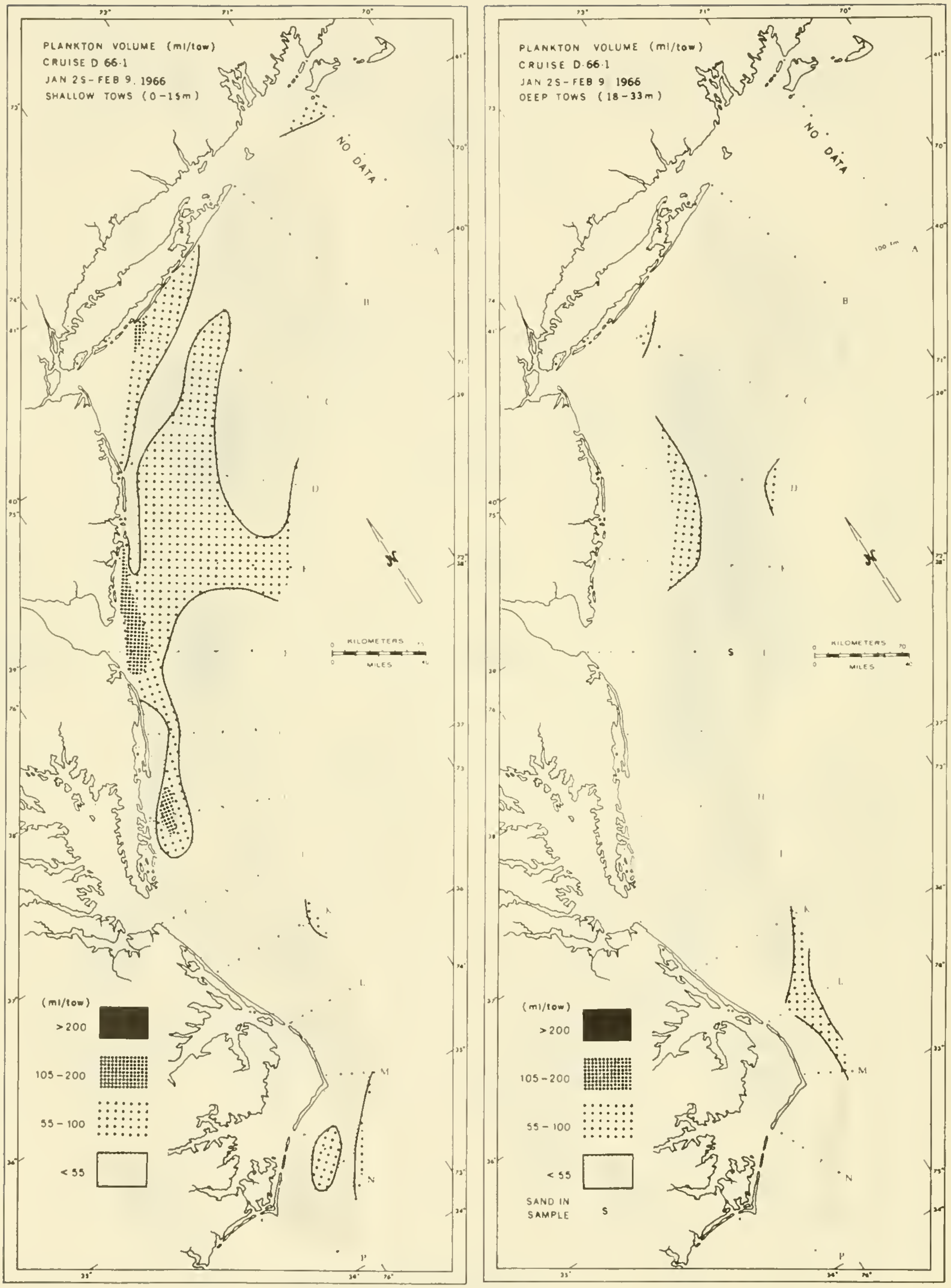

PLANKTON VOLUME (ml/tow)
CRUISE D 66-1
JAN 25-FEB 9, 1966
SHALLOW TOWS (0-15m)
NO DATA
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55
PLANKTON VOLUME (ml/tow)
CRUISE D-66-1
JAN 25-FEB 9 1966
DEEP TOWS (18-33m)
NO DATA
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55
SAND IN SAMPLE
S

Figure F2

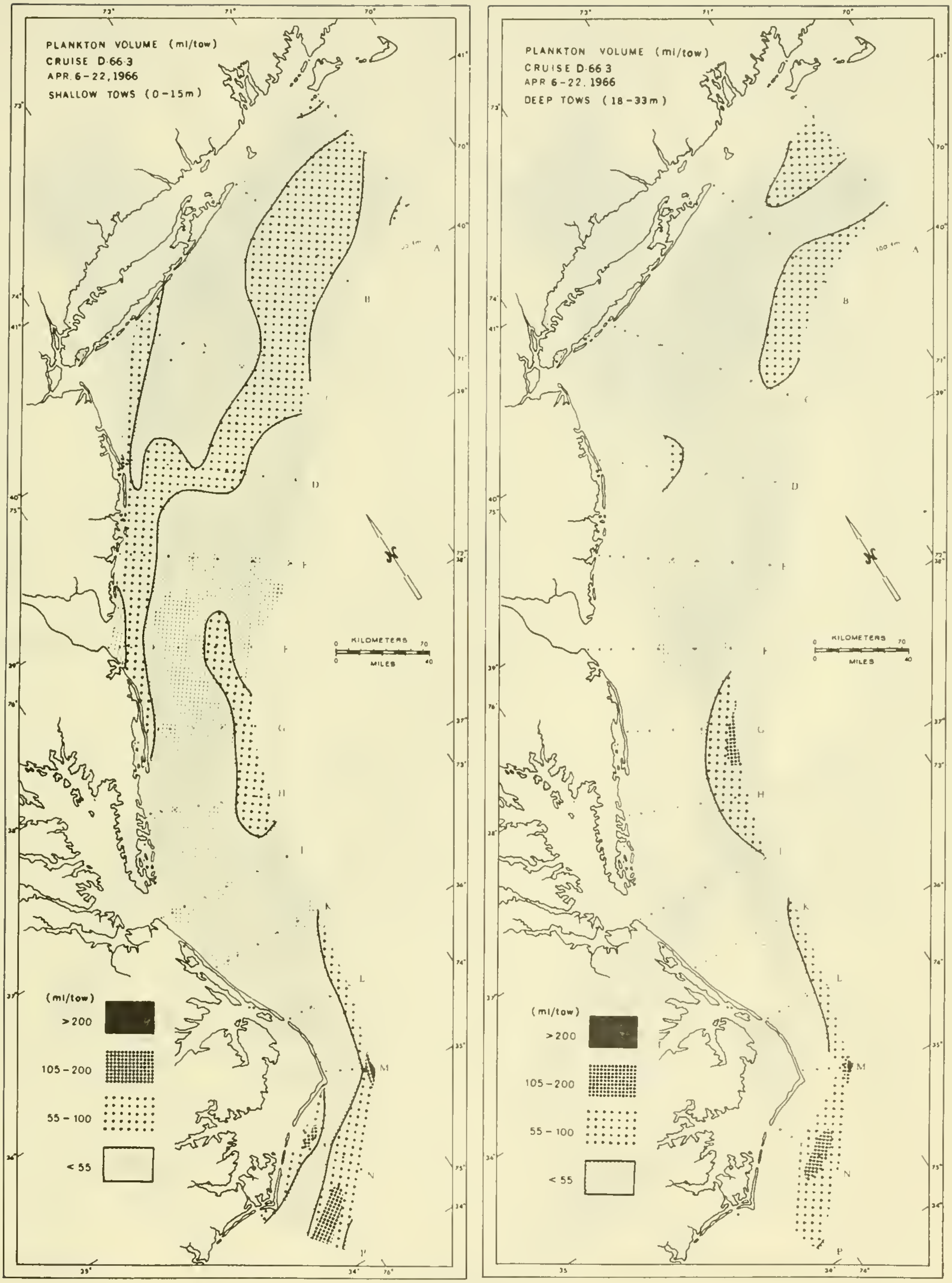

PLANKTON VOLUME (ml/tow)
CRUISE D-66-3
APR. 6-22, 1966
SHALLOW TOWS (0-15m)
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55
PLANKTON VOLUME (ml/tow)
CRUISE D-66-3
APR 6-22, 1966
DEEP TOWS (18-33m)
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55

Figure F3

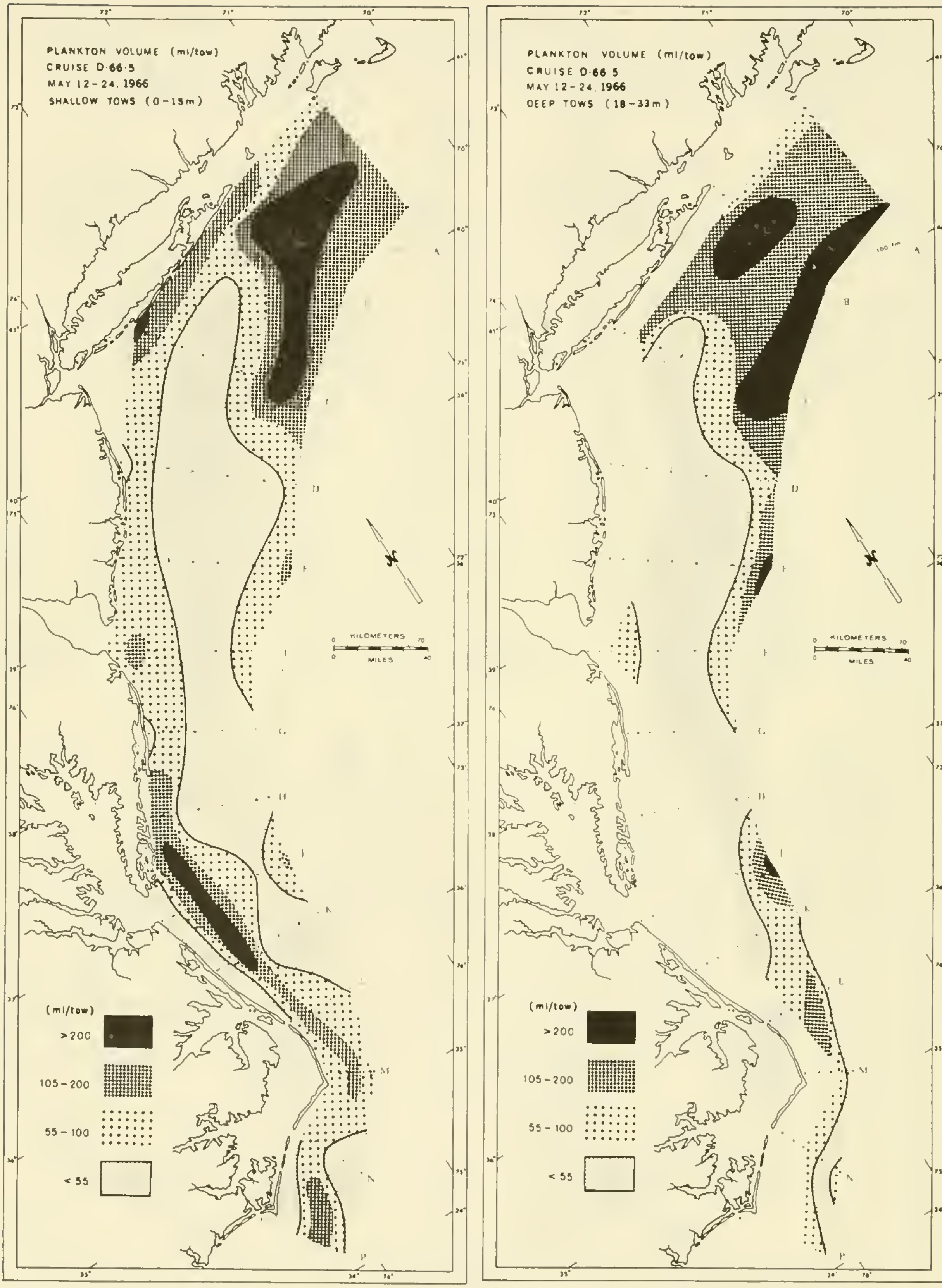

PLANKTON VOLUME (ml/tow)
CRUISE D-66-5
MAY 12-24, 1966
SHALLOW TOWS (0-15m)
PLANKTON VOLUME (ml/tow)
CRUISE D-66-5
MAY 12-24, 1966
DEEP TOWS (18-33m)
KILOMETERS
MILES
(ml/tow)
>200
105-200
55-100
<55

Figure F4

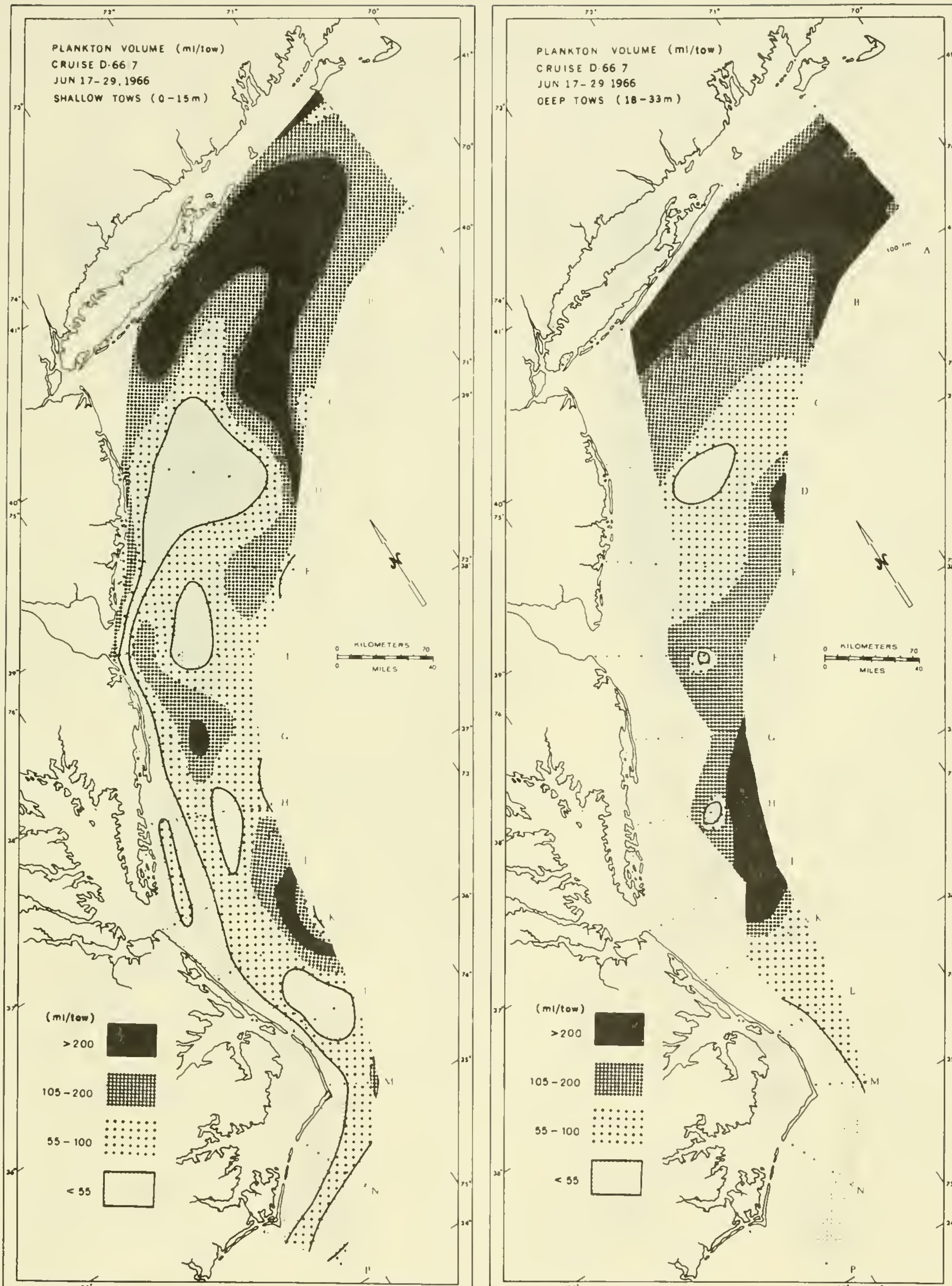

PLANKTON VOLUME (ml/tow)
CRUISE D-66 7
JUN 17-29, 1966
SHALLOW TOWS (0-15m)
(ml/tow)
>200
105-200
55-100
< 55
KILOMETERS
MILES
PLANKTON VOLUME (ml/tow)
CRUISE D-66 7
JUN 17-29 1966
DEEP TOWS (18-33m)
100 fm
(ml/tow)
>200
105-200
55-100
< 55
KILOMETERS
MILES

Figure F5

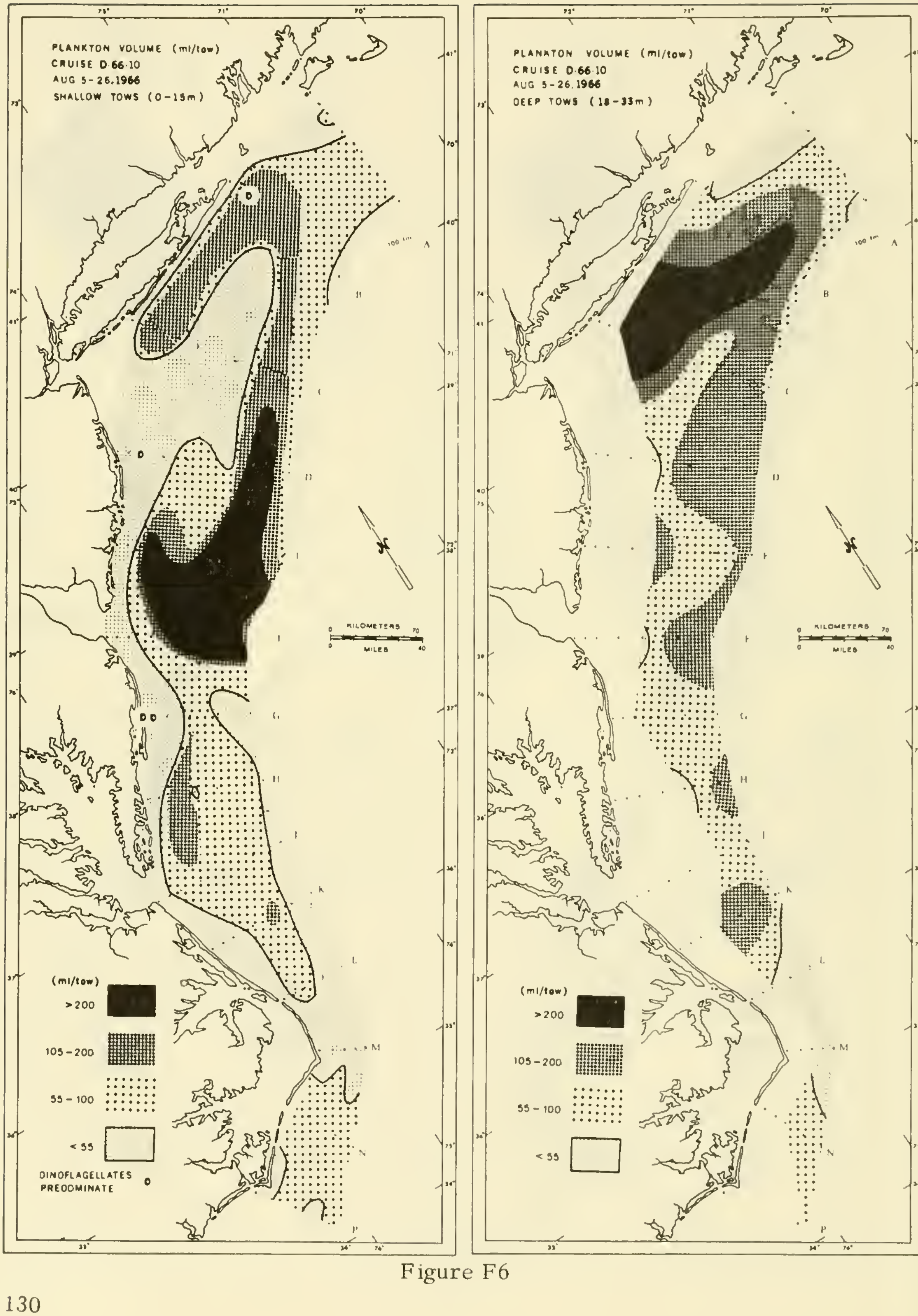

PLANKTON VOLUME (ml/tow)
CRUISE D-66-10
AUG 5-26, 1966
SHALLOW TOWS (0-15m)
(ml/tow)
>200
105-200
55-100
< 55
DINOFLAGELLATES PREDOMINATE
KILOMETERS
MILES
PLANKTON VOLUME (ml/tow)
CRUISE D-66-10
AUG 5-26, 1966
DEEP TOWS (18-33m)
(ml/tow)
>200
105-200
55-100
< 55

Figure F6

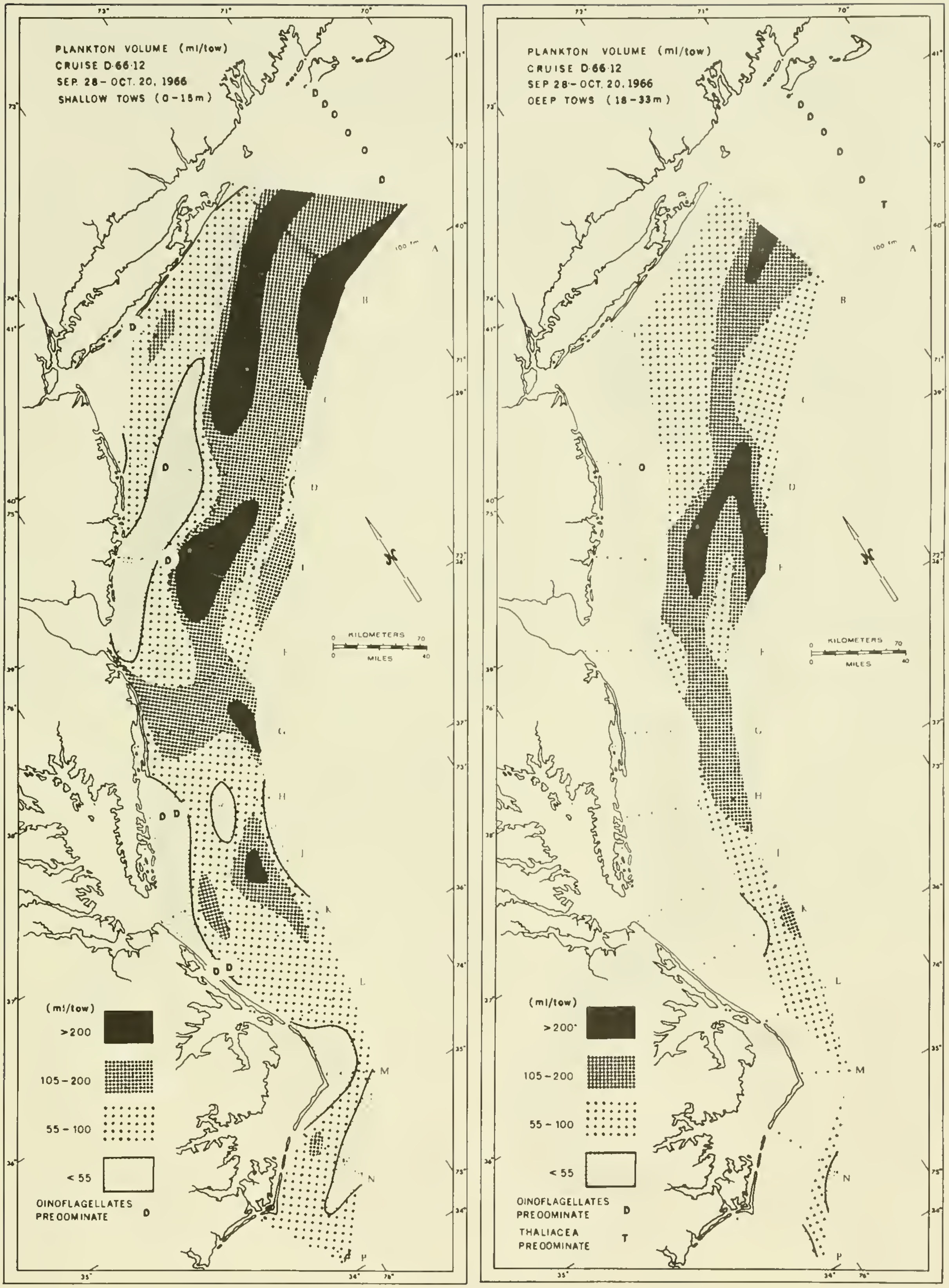

PLANKTON VOLUME (ml/tow)
CRUISE D-66-12
SEP. 28 – OCT. 20, 1966
SHALLOW TOWS (0-15m)
(ml/tow)
>200
105-200
55-100
<55
DINOFLAGELLATES PREDOMINATE D
KILOMETERS
MILES
PLANKTON VOLUME (ml/tow)
CRUISE D-66-12
SEP. 28 – OCT. 20, 1966
DEEP TOWS (18-33m)
THALIACEA PREDOMINATE T

Figure F7

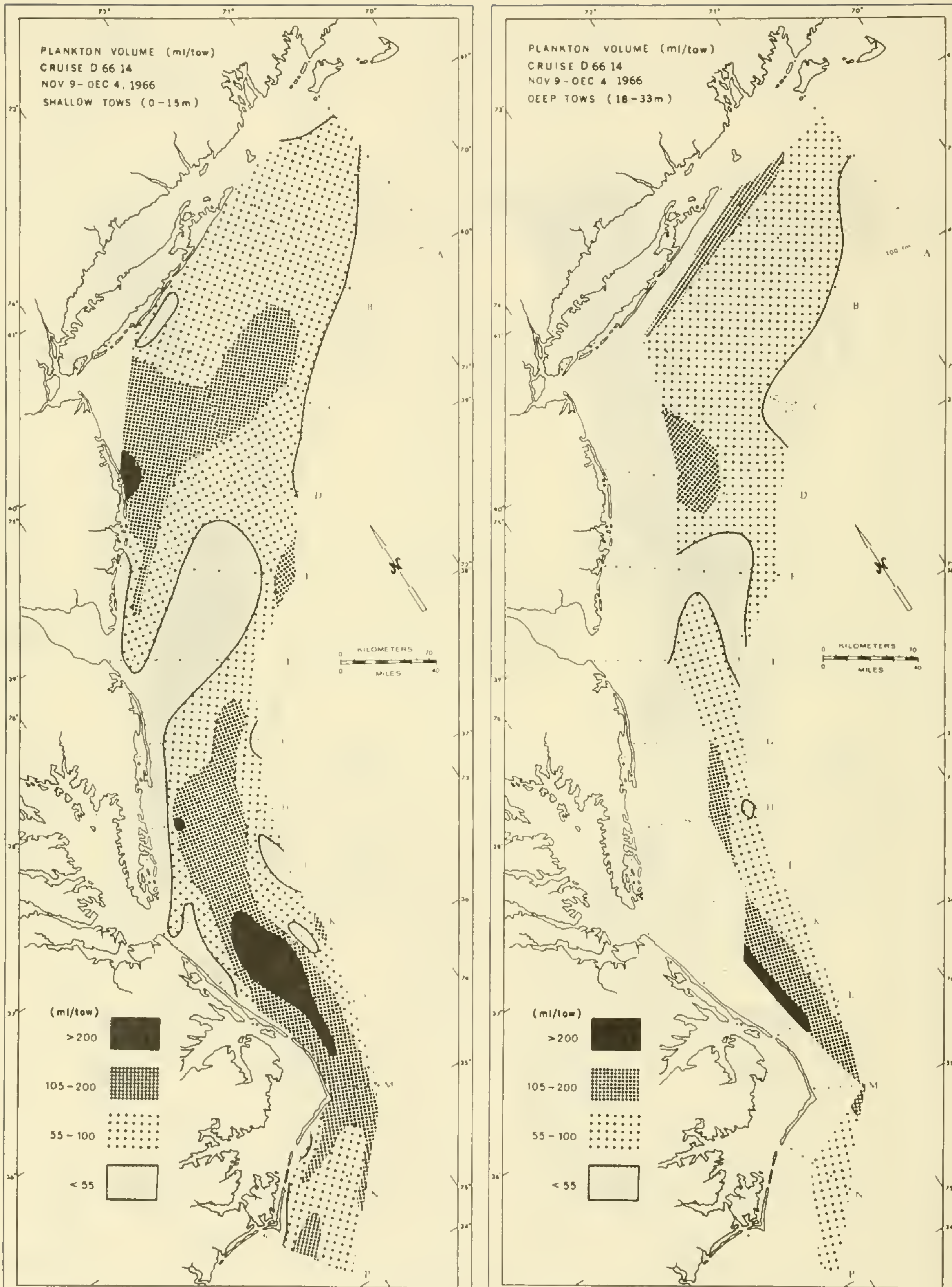


Figure F8

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